

International law and lions (*Panthera leo*): understanding and improving the contribution of wildlife treaties to the conservation and sustainable use of an iconic carnivore

Arie Trouwborst¹, Melissa Lewis¹, Dawn Burnham², Amy Dickman², Amy Hinks², Timothy Hodgetts², Ewan A. Macdonald², David W. Macdonald²

¹ Department of European and International Public Law, Tilburg University, Tilburg, The Netherlands

² Wildlife Conservation Research Unit (WildCRU), University of Oxford, Tubney, United Kingdom

Corresponding author: Arie Trouwborst (a.trouwborst@tilburguniversity.edu)

Academic editor: S. Williams | Received 10 June 2017 | Accepted 8 August 2017 | Published 13 September 2017

<http://zoobank.org/B0E33B35-52C0-45B9-8A54-4A60F6D1FE5C>

Citation: Trouwborst A, Lewis M, Burnham D, Dickman A, Hinks A, Hodgetts T, Macdonald EA, Macdonald DW (2017) International law and lions (*Panthera leo*): understanding and improving the contribution of wildlife treaties to the conservation and sustainable use of an iconic carnivore. Nature Conservation 21: 83–128. <https://doi.org/10.3897/natureconservation.21.13690>

Abstract

The lion (*Panthera leo*) is featuring ever more prominently on the agendas of international wildlife treaties like the Convention on International Trade in Endangered Species (CITES) and the Convention on the Conservation of Migratory Species of Wild Animals (CMS). Lion range and numbers have declined markedly over the last two decades. In this review we assess the present role of international wildlife treaties with a view to improving their combined contribution to the conservation and sustainable use of lions. Our analysis identifies a substantial body of relevant international wildlife law and, moreover, a significant potential for enhancing the contribution to lion conservation of these global and regional treaties. The time is right to invest in such improvements, and our review renders a range of general and treaty-specific recommendations for doing so, including making full use of the Ramsar Wetlands Convention, World Heritage Convention and transboundary conservation area (TFCA) treaties for lion conservation. The CMS holds particular potential in this regard and our analysis provides strong support for listing the lion in its Appendices.

Keywords

Lion, law, international wildlife law, Convention on Migratory Species (CMS), Convention on International Trade in Endangered Species (CITES), Ramsar Wetlands Convention, World Heritage Convention, Convention on Biological Diversity (CBD)

Introduction

Lion (*Panthera leo*) conservation features prominently on the agendas of international wildlife treaties like the 1973 Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the 1979 Convention on the Conservation of Migratory Species of Wild Animals (CMS or Bonn Convention). Lion range and numbers have declined markedly over the last two decades (Bauer et al. 2016). In this review we assess the present role of international wildlife treaties with a view to improving their combined contribution to the conservation and sustainable use of the lion.

International law and large carnivores

Within the broad arena of the ongoing global biodiversity crisis (Ceballos et al. 2015), large-bodied species are generally more vulnerable than small-bodied species, and their population trends reflect this (Di Marco et al. 2014; Ripple et al. 2014; Ripple et al. 2015). With some exceptions, such as most European large carnivore populations (Chapron et al. 2014), the world's largest carnivores, including lions, are declining, with range contractions and worsening conservation status (Ripple et al. 2014; Bauer et al. 2016). Given the important ecological roles of large carnivores, their demise tends to have negative ecological impacts for other species and ecosystems too (Ripple et al. 2014). Recently, a large number of conservation scientists involved with large carnivore and large herbivore conservation called for 'comprehensive actions to save these iconic wildlife species', appealing to all disciplines involved, and duly noting the role of international wildlife conservation treaties as part of this joint endeavor (Ripple et al. 2016a).

In the overall effort to stem and reverse biodiversity loss, law is a crucial instrument (Chapron et al. 2017), including international wildlife law (Bowman et al. 2010; Trouwborst et al. 2017c). International wildlife law – alternatively referred to as international nature conservation law or international biodiversity law – consists mainly of intergovernmental agreements aimed at conservation of (terrestrial and marine) species, natural areas, ecosystems, and/or biodiversity at large. These have been adopted by states, *inter alia*, with a view to the transboundary movements and occurrence of wildlife populations; the international nature of some of the threats to wildlife; and the notion that biodiversity conservation is considered a 'common concern of mankind', as recorded in the preamble to the 1992 Convention on Biological Diversity (CBD). Effective conservation calls for cross-border approaches and long-term commitments. International law is the pre-eminent mechanism for realizing these, and despite the inherent limitations of international treaties and the various challenges to their effective implementation, many species would have been (even) worse off without international wildlife law (Bowman et al. 2010; Gillespie 2011; Bowman 2016; Trouwborst et al. 2017c).

International wildlife treaties have contributed to biodiversity conservation in many different ways, including through protected areas designated pursuant to international commitments; similarly instigated national legislation regulating wildlife exploitation; enhanced priority accorded to conservation issues on governments' agendas; incorporation of technical guidance adopted by treaty bodies into national action plans and legislation; coordinated collection of data; increased cooperation among and between governmental and non-governmental stakeholders; direct assistance to conservation initiatives through treaties' funding mechanisms; and through many instances where harmful developments were blocked or particular conservation actions taken when governments were confronted with their international obligations in (inter)national court proceedings or compliance mechanisms (Bowman et al. 2010; Gillespie 2011; Trouwborst 2015a; Bowman 2016; Scott 2016; Trouwborst et al. 2017c). There still appears to be significant room for increasing the contribution made by international wildlife law to conservation, not only by enhancing the legal framework itself, but also by maximising the legal instruments currently available (Trouwborst 2015a; Bowman 2016).

Across the globe, large carnivores present a special set of conservation issues from a legal perspective, given *inter alia* their great spatial requirements, elevated human-wildlife conflict potential, and roles as keystone and/or umbrella species (Macdonald et al. 2013; Trouwborst 2015a; Treves et al. 2015). For these reasons, and because of the transboundary nature of many large carnivore populations and some of their threats, international law has a distinct role (Trouwborst 2015a), though this has received little attention in the scholarly literature. Most in-depth research on international law and large carnivores has focused on wolves (*Canis lupus*), brown bears (*Ursus arctos*) and lynx (*Lynx lynx*) in Europe (for a range of examples, see www.clawsandlaws.eu and www.tilburguniversity.edu/iuscarnivoris), with only one general review of the relevance of international wildlife law for the world's 31 largest terrestrial carnivores (Trouwborst 2015a), and one initial analysis focusing on lions in Africa (Watts 2016).

Lions and international law

The lion is archetypal in all of the aforementioned respects. Given its ecological importance as an apex predator, it is a keystone species. It is also an umbrella species, in that lion conservation tends to benefit a range of other species (Caro 2003; Macdonald et al. 2012; Dickman et al. 2015). Lions certainly have large spatial requirements, and coexistence with humans, particularly outside protected areas, is often problematic (Loveridge et al. 2010). There is, moreover, a strong international dimension to lion conservation. Many of the currently remaining lion populations straddle international boundaries (Dickman et al. submitted); close links exist between the conservation and management of lions and international tourism and trophy hunting; the recognition of many natural areas in Africa as sites of international importance under conservation treaties is intimately linked to the presence of lions (Watts 2016); there is an increasing international trade in lion parts (Williams et al. 2015; Williams et al. submitted a;

Williams et al. submitted b); and the worrying conservation status of lions is of international concern to conservationists and to the global public (Macdonald et al. 2016) as one of the most iconic and charismatic species (Macdonald et al. 2015).

Globally, the lion has featured on the IUCN Red List as ‘Vulnerable’ since 1996. Numbers of wild lions have been steadily decreasing and the global population may be approaching 20,000, with the species persisting in only 8–17% of its historic range (Riggio et al. 2013; Bauer et al. 2016; Dickman et al. submitted). According to the latest Red List assessment, lions remain in 25 sub-Saharan African countries and in a small part of India (Bauer et al. 2016). They have gone extinct in 26 African and Eurasian countries; and are ‘possibly extinct’ in 7 African countries (Bauer et al. 2016). Dickman et al (submitted) have recently mapped the 60 known remaining populations of lions, and only six of these populations consist of more than 1,000 individuals: Selous-Niassa, Serengeti-Mara, Kavango-Zambezi, Greater Limpopo, Katavi-Ruaha and Kgalagadi (see Figure 1). Just under half of the wild lion estate lies within protected areas, and Lindsey et al. (2017) have demonstrated that even there, in most cases the lions are thought to live well below carrying capacity and at considerable threat from infra-structural inadequacies largely derived from shortage of funds. There is a marked difference between the sharp declines observed in most range states, and the situation in four southern African countries (Botswana, Namibia, South Africa, Zimbabwe) and India, where lion populations have declined only slightly, or are stable or increasing (Bauer et al. 2016). The West African lion subpopulation is listed as ‘Critically Endangered’ (Henschel et al. 2015). The only remaining population of Asiatic lions (*Panthera leo persica*) is considered ‘Endangered’ (Breitenmoser et al. 2008), although local human attitudes have been remarkably benign (Venkataraman et al. 2014).

Threats to lions include direct persecution, mainly retaliatory or preventive killing to protect livestock or human life; the depletion of their prey base, mainly due to poaching in connection with an unsustainable bushmeat trade (see also Ripple et al. 2016b; Sandom et al. 2017); habitat loss; and killing fueled by an increasing demand for lion bones and body parts (Bauer et al. 2016; Panthera et al. 2017). The first two of these threats – human-lion conflict and bushmeat poaching – are considered the gravest (Panthera et al. 2017). Trophy hunting can have positive or negative impacts, depending on how well it is regulated (Bauer et al. 2016; Loveridge et al. 2016; Macdonald 2016; Macdonald et al. 2017).

Dickman et al’s (submitted) rangewide analysis identifies for each population, and for each country within which lions still occur, the intersection of ecological and infra-structural fragilities. The latter forms a backcloth against which to consider the pattern of international law in those same countries. Against this backcloth, and building on Watts (2016), this review aims to explore the current and potential future utility of international wildlife law for lion conservation. Experience, including our own, indicates that this is best achieved through a multidisciplinary approach (Macdonald and Chapron 2017), whereby legal experts join forces with ecologists and experts from other disciplines with a good understanding of the broader context and the actual

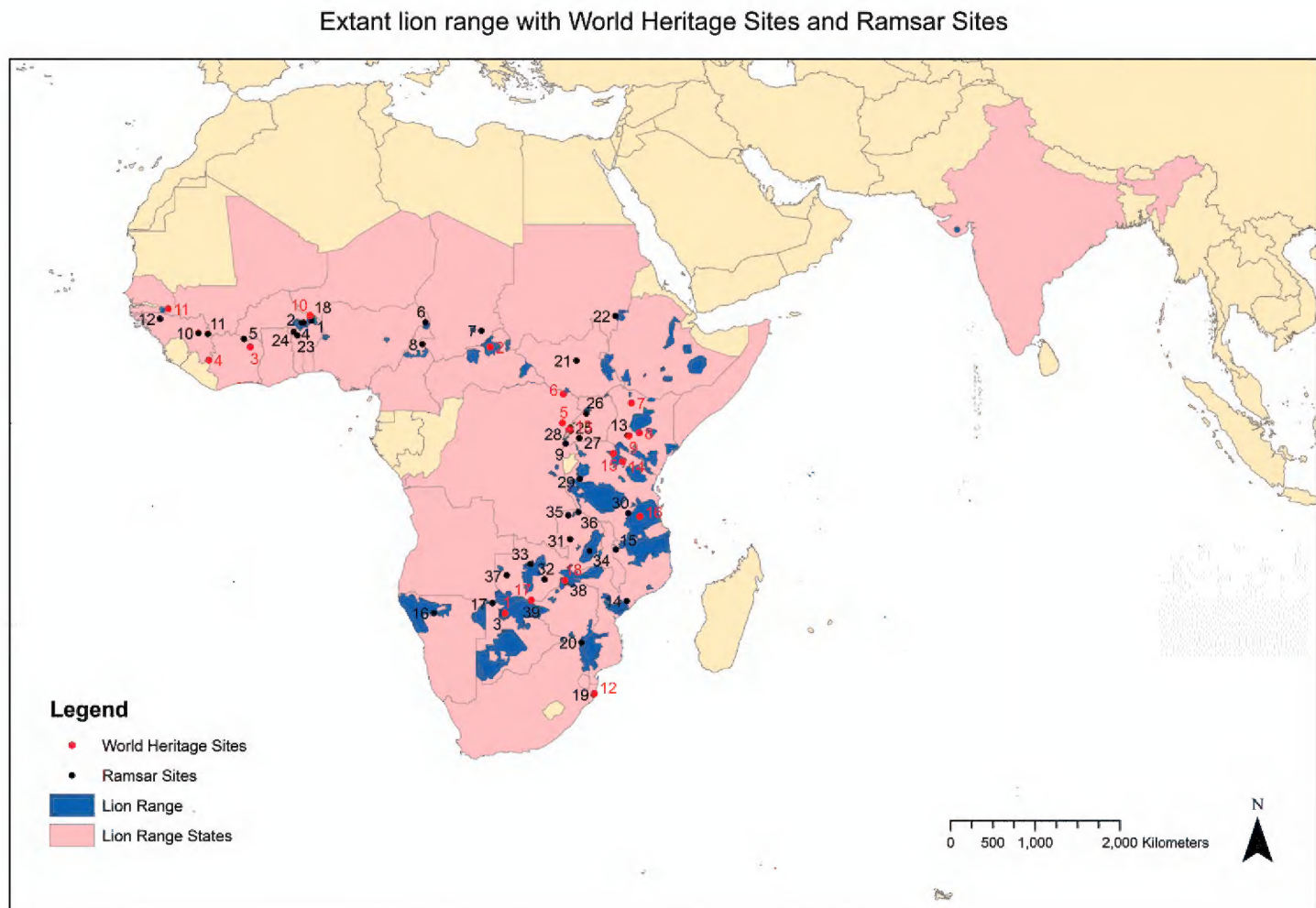


Figure 1. Extant lion range (excluding small fenced reserves), Ramsar-listed sites and World Heritage sites. The numbers indicate the locations of the sites listed in Tables 3 and 4.

conservation needs of species. Such cooperation has, encouragingly, been gathering momentum in recent years (Cliquet et al. 2009; Trouwborst et al. 2015; Epstein et al. 2016; Selier et al. 2016; Treves et al. 2017; Trouwborst et al. 2017a; Chapron et al. 2017; Redpath et al. 2017; Trouwborst et al. 2017c). Our review, performed by legal experts, conservation biologists and social scientists, builds on this momentum.

Though focus is thus on lions, the results of our review are likely to be relevant also for other large carnivore species, particularly in Africa, such as leopard (*Panthera pardus*), cheetah (*Acinonyx jubatus*), wild dog (*Lycaon pictus*) and hyaenas (*Crocuta crocuta*, *Hyaena hyaena*, *Hyaena brunnea*).

Method

Our analysis is based on standard legal research methodology, involving the selection and interpretation of international legal instruments of relevance to lion conservation (Trouwborst 2015b). For reasons of space, we limit this analysis to international *wildlife* law, although we note the existence of other fields of international law with direct or indirect significance for lion conservation, such as legal instruments dealing with crime, corruption, climate change, or indeed the regulation of pesticides, some of which are used to poison lions (Watts 2016). For each legal instrument, we offer a

concise explanation of the most relevant legal obligations (for more exhaustive information on those obligations and general background concerning the treaty regimes involved we refer readers to works such as Bowman et al. (2010) and Gillespie (2011), and the websites of the various treaties). On that basis, we analyze the various legal instruments and obligations within their broader context, incorporating knowledge and insights regarding lions and their conservation needs, and regarding the varying, real-world concerns of the various lion range states and their human populations. We focus on the 33 lion range states identified in the IUCN Red List assessment, including 7 states where lions are considered ‘possibly extinct’. We do so in particular with a view to the potential for lion recolonization or reintroduction.

Overview of the international law and policy framework for lion conservation

Binding instruments

Treaties of importance to lion conservation are listed in Table 1. Table 2 and Figure 2 indicate the extent to which the various lion range states are currently bound by eight of these lion-related treaties under international law as contracting parties. The methods employed by the various treaties vary. Some treaties operate on the basis of species lists, with a particular legal regime associated with each list; others involve the listing of sites; yet others do not employ lists. The treaties’ geographic scopes also vary.

Five treaties are global. These ‘Big 5’ of international wildlife law are the 1971 Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention), the 1972 UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention or WHC), CITES, CMS and CBD. Lions have been in the spotlight mostly in connection with CITES and, in recent years, the CMS. In May 2016, CITES and CMS jointly hosted an intergovernmental meeting in Entebbe, which was dedicated specifically to African

Table 1. Treaties of relevance to lion conservation. The relevance of each treaty or category of treaties is indicated for African lion subpopulations and Asiatic lion, respectively. N/A = not applicable.

	African lion	Asiatic lion (<i>P. leo persica</i>)
Ramsar Convention	Habitat in 39 listed sites	No listed habitat
World Heritage Convention	Habitat in 18 listed sites	No listed habitat
CITES	Listed in Appendix II	Listed in Appendix I
CMS	Not (yet) listed, but covered	Not (yet) listed, but covered
CBD	General relevance	General relevance
African Convention	Listed in Annex, Class B	N/A
Bern Convention	Not listed, but covered	N/A
SADC Protocol	General relevance	N/A
Lusaka Agreement	General relevance	N/A
TFCA treaties	General relevance	N/A

Table 2. Lion range states and their participation in relevant treaties. List of lion range states as provided in the IUCN Red List of Threatened Species 2016 (excluding previous range states in which the species is known to be extinct), indicating their participation in relevant treaties. PE = possibly extinct; X = contracting party; - = not currently a contracting party, but could become one; N/A = not applicable (i.e. the country falls outside of the instrument's geographic scope).

Range state	Ramsar	WHC	CITES	CMS	CBD	African Convention	SADC Protocol	Lusaka Agreement
Angola	-	X	X	X	X	-	-	-
Benin	X	X	X	X	X	-	N/A	-
Botswana	X	X	X	-	X	-	X	-
Burkina Faso	X	X	X	X	X	X	N/A	-
Cameroon	X	X	X	-	X	X	N/A	-
Central African Republic	X	X	X	-	X	X	N/A	-
Chad	X	X	X	X	X	-	N/A	-
Côte d'Ivoire (PE)	X	X	X	X	X	X	N/A	-
Dem. Rep. of Congo	X	X	X	X	X	X	-	-
Ethiopia	-	X	X	X	X	-	N/A	-
Ghana (PE)	X	X	X	X	X	X	N/A	-
Guinea (PE)	X	X	X	X	X	X	N/A	-
Guinea-Bissau (PE)	X	X	X	X	X	-	N/A	-
India	X	X	X	X	X	N/A	N/A	N/A
Kenya	X	X	X	X	X	X	N/A	X
Malawi	X	X	X	-	X	X	X	-
Mali (PE)	X	X	X	X	X	X	N/A	-
Mozambique	X	X	X	X	X	X	X	-
Namibia	X	X	X	-	X	-	X	-
Niger	X	X	X	X	X	X	N/A	-
Nigeria	X	X	X	X	X	X	N/A	-
Rwanda (PE)	X	X	X	X	X	X	N/A	-
Senegal	X	X	X	X	X	X	N/A	-
Somalia	-	-	X	X	X	-	N/A	-
South Africa	X	X	X	X	X	-	X	-
South Sudan	X	X	-	-	X	-	N/A	-
Sudan	X	X	X	-	X	X	N/A	-
Swaziland	X	X	X	X	X	X	-	-
Togo (PE)	X	X	X	X	X	X	N/A	-
Uganda	X	X	X	X	X	X	N/A	X
Un. Rep. of Tanzania	X	X	X	X	X	X	X	X
Zambia	X	X	X	-	X	X	X	X
Zimbabwe	X	X	X	X	X	-	X	-
33	30	32	32	25	33	21	8	4

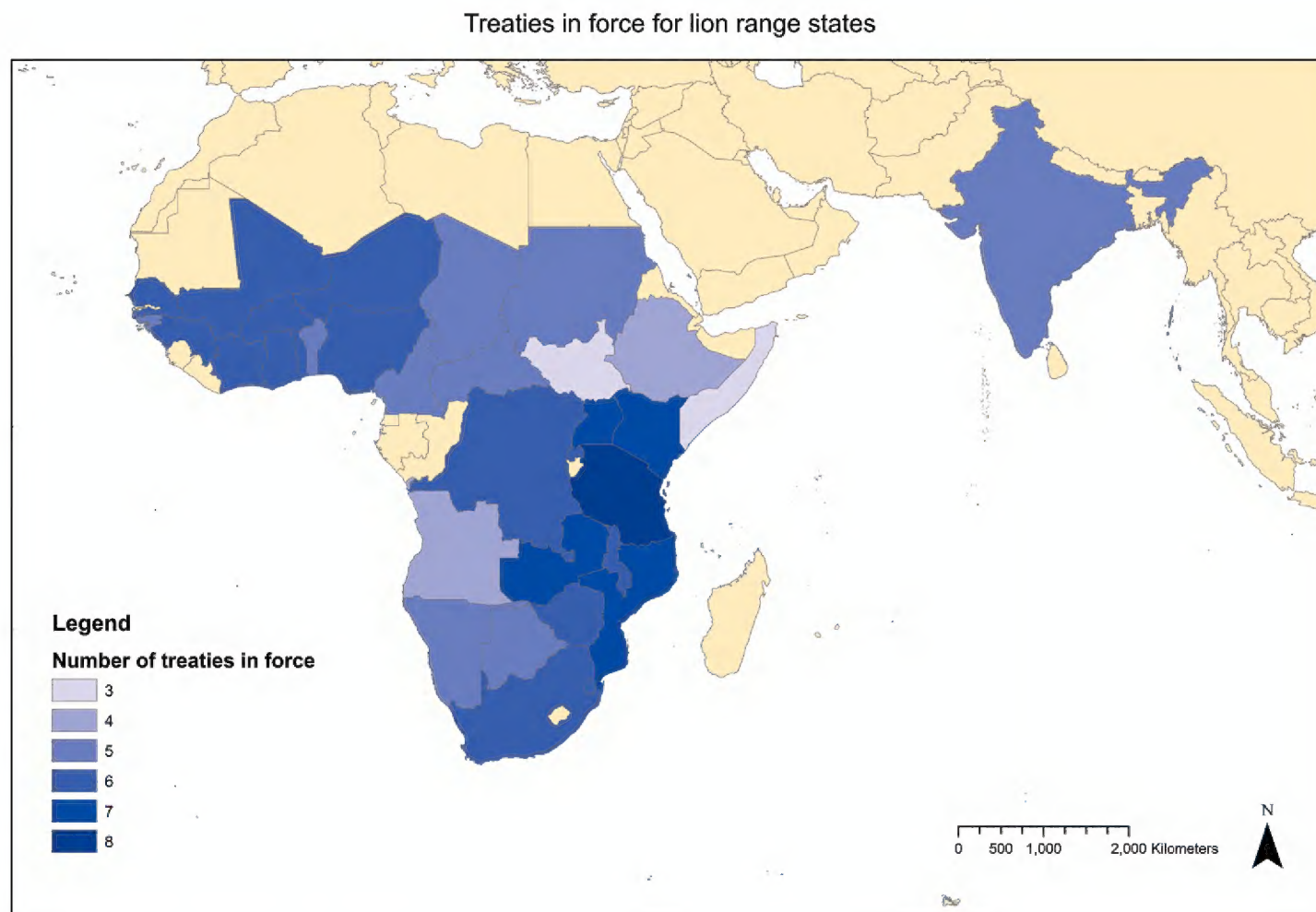


Figure 2. The map shows to how many of the 8 lion-related treaties mentioned in Table 2 each lion range state is a contracting party.

lion conservation and was attended by delegations of 28 of the 33 range states. The five global treaties are analyzed separately below.

Relevant regional treaties are the 1968 African Convention on the Conservation of Nature and Natural Resources (African Convention), the 1994 Agreement on Co-operative Enforcement Operations Directed at Illegal Trade in Wild Fauna and Flora (Lusaka Agreement), the 1999 Protocol (to the 1992 Treaty of the Southern African Development Community) on Wildlife Conservation and Law Enforcement (SADC Protocol), and various treaties establishing transfrontier conservation areas (TFCAs). Curiously, even the 1979 Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) is of potential, albeit more marginal, significance to lion conservation (see below). Pertinent instruments that have not yet entered into force include the 2003 revision of the African Convention and the 2005 Protocol on Environment and Natural Resources Management to the 1999 Treaty for the Establishment of the East African Community (EAC Treaty) – although we note the relevance to lion conservation of some provisions of the EAC Treaty itself.

Below, we provide individual analyses of the most relevant treaties, in particular the Big 5 global conventions, in chronological order of their adoption, followed by selected regional instruments.

Non-binding instruments

The distinction between binding and non-binding instruments is important. Treaties (which can alternatively be titled 'Agreement', 'Convention' or 'Protocol'), when in force, impose obligations on their contracting parties that are binding under public international law. These legal obligations should be distinguished from the host of non-binding instruments called 'Declaration', 'Communiqué', 'Memorandum of Understanding', 'Action Plan', 'Strategy', 'Programme', 'Initiative', and the like. Many of the decisions (Resolutions, Recommendations, etc.) adopted by wildlife treaties' Conferences of the Parties (COPs – their main decision-making bodies in which all parties are represented and which meet periodically) are as such non-binding, although they do have the potential to influence the interpretation of the binding obligations in the treaties themselves.

A pertinent example of a non-binding instrument is the Communiqué adopted by the aforementioned CITES-CMS African lion range state meeting in 2016 (Entebbe Communiqué), and it is worthwhile to reproduce a selection of the statements it contains. The Communiqué records 'the main threats (listed in no particular order) for lions in Africa' to be:

- (1) 'Unfavourable policies, practices and political factors (in some countries);
- (2) Ineffective lion population management;
- (3) Habitat degradation and reduction of prey base;
- (4) Human-lion conflict;
- (5) Adverse socio-economic factors;
- (6) Institutional weakness; and
- (7) Increasing trade in lion bones.'

Amongst the recommended measures to counter these threats, the Communiqué issues a call on range states to 'strengthen their legislation on lion conservation' and adopt practices 'ensuring that agricultural activities and mining operations do not impede lion conservation.' Furthermore, and significantly for present purposes, the Entebbe Communiqué recognizes 'the need for transboundary cooperation and management systems in light of the high number of transboundary lion populations.' It also emphasizes the notorious 'lack of resources and capacity,' which has 'impeded the implementation of lion conservation activities on the ground.' Notably, the Communiqué contains the following statement on the controversial issue of lion trophy hunting, wherein the 28 range states that attended the meeting:

'*Highlight* the benefits that trophy hunting, where it is based on scientifically established quotas, taking into account the social position, age and sex of an animal, have, in some countries, contributed to the conservation of lion populations and *highlight* the potentially hampering effects that import bans on trophies could have for currently stable lion populations.'

Generally, the lion range states call upon ‘CITES, CMS and IUCN to actively support conservation activities,’ *inter alia* through the establishment of a ‘mechanism to develop and implement joint lion conservation plans and strategies, capacity-building in lion conservation and management,’ and also of a ‘fund for specific emergency projects for lion conservation.’ In addition, the Communiqué contains several specific considerations regarding CITES and CMS which will be discussed below. Thus, whereas the Entebbe Communiqué is not a legally binding document, it does reflect a consensus amongst 28 range states regarding the threats to lions and the measures to be taken, which can in turn feed into the application of international wildlife treaties to lion conservation.

Of particular significance for present purposes are the two regional Lion Conservation Strategies that were developed in 2006 for West and Central Africa (IUCN 2006a), and Eastern and Southern Africa (IUCN 2006b) respectively. These were prepared by the IUCN SSC Cat Specialist Group, at the instigation of the 13th CITES COP in 2004, and with the support of a range of other stakeholders. The Conservation Strategy for the Lion in West and Central Africa sets out four objectives, together with a range of recommended actions to achieve them: (1) conserve lion habitat in the region; (2) conserve the lion’s wild prey base; (3) achieve sustainable human-lion coexistence; and (4) reduce the factors decreasing the viability of lion populations (IUCN 2006a). The overall goal of the Conservation Strategy for the Lion in Eastern and Southern Africa is to ‘secure, and where possible, restore sustainable lion populations throughout their present and potential range’ within the region, ‘recognizing their potential to provide substantial social, cultural, ecological and economic benefits’ (IUCN 2006b). Amongst several objectives identified to achieve this, the Strategy recommends the development and implementation of ‘harmonious, comprehensive legal and institutional frameworks that provide for the expansion of wildlife-integrated land use, lion conservation and associated socio-economic benefits in current and potential lion range’, as well as the alignment of global legal frameworks such as CITES and CMS with the conservation needs of lions in the region (IUCN 2006b). At the request of the 11th CMS COP in 2014, the two regional strategies were reviewed by Bauer et al. (2015). The Entebbe Communiqué adopted by the 2016 CITES-CMS African lion range state meeting affirms that ‘all the objectives of the Regional Lion Conservation Strategies ... remain valid.’ Thus, even if the strategies themselves are not legally binding, we note their close ties with the CITES and CMS legal frameworks in particular, and will revisit their relevance below.

Ramsar Wetlands Convention

In 1971, the Ramsar Convention was adopted in order to ‘stem the progressive encroachment on and loss of wetlands’ (Preamble). Wetlands are defined in the Convention as ‘areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres’ (Article 1(1)).

The Ramsar Convention's central feature is a List of Wetlands of International Importance, presently comprising over 2,000 sites spread across 169 countries, whereby it should be noted that many listed wetlands also include dry areas within their boundaries. The Convention's contracting parties 'shall formulate and implement their planning so as to promote the conservation of the wetlands included in the List, and as far as possible the wise use of wetlands in their territory' (Article 3(1)). Notably, the latter half of this obligation applies to *all* wetlands. 'Wise use' of wetlands is understood as 'the maintenance of their ecological character, achieved through the implementation of ecosystem approaches, within the context of sustainable development' (Ramsar COP Resolution IX.1, 2005). Parties to the Ramsar Convention are also required to 'promote the conservation of wetlands ... by establishing nature reserves on wetlands, whether they are included in the List or not, and provide adequately for their wardening' (Article 4(1)). They are furthermore expected to cooperate regarding transboundary wetlands and to 'coordinate and support present and future policies and regulations concerning the conservation of wetlands and their flora and fauna' (Article 5).

Adding sites to the Ramsar List is done principally by the contracting parties themselves. Each party must designate at least one site of 'international importance in terms of ecology, botany, zoology, limnology or hydrology' for inclusion in the List (Article 2). For every candidate site, the domestic authority involved completes a 'Ramsar Information Sheet' detailing how the site meets the selection criteria, with the Convention Secretariat verifying that it indeed does so. Parties can coordinate the listing of the respective parts of transboundary wetlands located on their territories, resulting in 'Transboundary Ramsar Sites'. Deletions or boundary restrictions of wetlands on the Ramsar List may be conducted only if an 'urgent national interest' of the contracting party involved so requires, and any associated loss of wetland resources should 'as far as possible' be compensated, for instance by creating additional nature reserves (Articles 2(5) and 4(2)). In order to guide the implementation of the aforementioned legal obligations, a large body of detailed recommendations regarding the conservation and wise use of wetlands has been adopted over the years by the Ramsar COP. For instance, the COP has clarified that any harvesting of wildlife (products) from a Ramsar-listed site should be 'regulated by a management plan developed in close consultation with the stakeholders,' and that the party involved is to 'ensure that the impact of the harvesting will not threaten or alter the ecological character of the site' (Ramsar COP Resolution VII.19, 1999, Annex).

Despite the Convention's initial emphasis on waterbirds, its broad objectives and obligations evidently also cover the conservation of other native wild fauna inhabiting wetlands generally, and wetlands on the List in particular. According to one of the criteria adopted by the COP to guide the selection of wetlands for inclusion in the List 'a wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species' (Ramsar COP Resolution VII.11, last amended by Resolution X.20, 2008). Listed wetlands that are under threat can be included in the so-called 'Montreux Record', a register of Ramsar sites 'where changes in ecological character have occurred, are occurring or are likely to occur' (Ramsar COP Recommendation 4.8, 1990).

Ramsar sites of importance to lions

Whereas the Ramsar Convention may not be the first treaty that comes to mind when thinking about lion conservation, lions certainly are amongst the beneficiaries of wetland conservation under the Convention – which currently binds 30 of the 33 lion range states (Table 2). Whereas lions can survive in very arid regions, home ranges normally include one or more sources of water. Besides providing water for the lions to drink, concentrations of prey animals also tend to be above average in riverine or marshy habitat and around waterholes (Valeix et al. 2010). Thus, the conservation and ‘wise use’ of such wetlands, even if they are small, is important from a lion conservation perspective. Notably, the definition of wetlands used under the Convention lacks a minimum size requirement and includes man-made ones, even ‘farm ponds, stock ponds, small tanks’ (Ramsar Convention Secretariat 2013), so that pumped water holes in game reserves are clearly covered, and therefore subject to the ‘wise use’ commitment of Article 3. There is also no minimum size requirement for listing a site as internationally important, with the result that even small or temporary sites may qualify for listing, as may clusters of small sites (Ramsar COP Resolution VII.11, 1999). On the other end of the scale, some African floodplains and other wetland ecosystems are so vast that they include many lion home ranges.

Many sites of significance to lions have been deemed of ‘international importance’ and included in the Ramsar List. Table 3 renders 39 Ramsar-listed sites which are of actual or potential importance to lions, spread over 19 countries. Their locations are indicated in Figure 1. They cover a total surface area of 368,609 km² (an area larger than Germany and almost as large as Zimbabwe). Most of these sites (21) are between 1,000 and 10,000 km². Examples are Parc National des Virunga in the DRC, Etosha Pan in Namibia, Kilombero Valley Floodplain in Tanzania (which overlaps with the Selous Game Reserve), Kafue Flats and Luangwa Flood Plains in Zambia, and Mana Pools National Park in Zimbabwe. Eight sites are smaller than 1,000 km², but such modest Ramsar sites can still be important for resident lions. Examples include Uganda’s Murchison Falls-Albert Delta Wetland System (17,293 ha) and Lake George (15,000 ha), and the Makuleke Wetlands in South Africa (7,757 ha). Ten huge Ramsar sites cover over 10,000 km² each, including the Bangweulu Swamps in Zambia, the Zambezi Delta in Mozambique (> 30,000 km²), and the Okavango Delta System in Botswana (> 55,000 km²).

In 24 out of 39 cases, the importance of the site for lions, usually alongside other species, is explicit in the official motivation filed by the contracting party for listing the site. (This applies to all sites in Table 3 except Parc National des Virunga; the two 2002 sites in Guinea; Lake Nakuru in Kenya; Etosha Pan in Namibia; Makuleke Wetlands and St Lucia System in South Africa; Sudd in South Sudan; the two sites in Togo; the four sites in Uganda; and Kafue Flats in Zambia.) Further, some of the sites in Table 3 had, or possibly had, lions when designated but (probably) no longer do. Examples are La Foret Classée et Réserve Partielle de Faune Comoé-Léraba in Burkina Faso, the three sites in Guinea, and the two sites in Togo. In such cases, the significance of the

Table 3. Ramsar sites of importance to lion conservation. Whereas most of these sites currently have lions, some sites have been included from which lions have disappeared in the recent past. Map codes indicate the sites' geographic locations as shown in Figure 1. For more detailed information on each site, including the reasons for listing and precise location and delimitation, see the Ramsar Sites Information Service database: <http://rsis.ramsar.org/>.

Country	Ramsar site	Size (ha)	Since	Map code
Benin	Site Ramsar du Complexe W	895,480	2006	1
	Zone Humide de la Rivière Pendjari	144,774	2007	2
Botswana	Okavango Delta System	5,537,400	1996	3
Burkina Faso	Réserve Totale de Faune d'Arly	134,239	2009	4
	La Forêt Classée et Réserve Partielle de Faune Comoé-Léraba	124,500	2009	5
Cameroon	Waza Logone Floodplain	600,000	2006	6
Chad	Plaines d'Inondation des Bahr Aouk et Salamat	4,922,000	2006	7
	Réserve de Faune de Binder-Léré	135,000	2005	8
Democratic Republic of the Congo	Parc National des Virunga	800,000	1996	9
Guinea	Niger-Niandan-Milo	1,046,400	2002	10
	Sankarani-Fié	1,015,200	2002	11
	Gambie-Koulountou	281,400	2005	12
Kenya	Lake Nakuru	18,800	1990	13
Mozambique	Zambezi Delta	3,171,172	2004	14
	Lake Niassa and its Coastal Zone	1,363,700	2011	15
Namibia	Etosha Pan	600,000	1995	16
	Bwabwata-Okavango Ramsar Site	46,964	2013	17
Niger	Parc National du W	220,000	1987	18
South Africa	St Lucia System	155,500	1986	19
	Makuleke Wetlands	7,757	2007	20
South Sudan	Sudd	5,700,000	2006	21
Sudan	Dinder National Park	1,084,600	2005	22
Togo	Parc National de la Keran	163,400	1995	23
	Bassin Versant Oti-Mandouri	425,000	2008	24
Uganda	Lake George	15,000	1988	25
	Murchison Falls-Albert Delta Wetland System	17,293	2006	26
	Lake Mburo-Nakivali Wetland System	26,834	2006	27
	Rwenzori Mountains Ramsar Site	99,500	2008	28
United Republic of Tanzania	Malagarasi-Muyovozi Wetlands	3,250,000	2000	29
	Kilombero Valley Floodplain	796,735	2002	30
Zambia	Bangweulu Swamps	1,100,000	1991	31
	Kafue Flats	600,500	1991	32
	Busanga Swamps	200,000	2007	33
	Luangwa Flood Plains	250,000	2007	34
	Mweru wa Ntipa	490,000	2007	35
	Tanganyika	230,000	2007	36
	Zambezi Floodplains	900,000	2007	37
Zimbabwe	Mana Pools National Park	220,034	2013	38
	Victoria Falls National Park	1,750	2013	39

Ramsar designation could, and should, be to safeguard the habitat and prey base of lions (Sandom et al. 2017) so that recolonization or reintroduction remains a future option. The same is true of some Ramsar sites in range states where lions are presently considered extinct. An example is Odzala Kokoua in Congo, which was included in the Ramsar List in 2012 on the basis of documentation mentioning lions as still present within the site. An instance where lions were reintroduced into an area that was designated a Ramsar site when lions were absent is the St Lucia System in South Africa (designated in 1986, lions reintroduced in 2013). One site from Table 3 is listed on the Montreux Record, namely Lake George in Uganda.

Using the Ramsar Convention for lion conservation

Protected areas are crucial to lion conservation. According to Lindsey et al. (2017), *given adequate management*, Africa's protected areas could theoretically support over 80,000 lions – up to four times the total wild lion population remaining in Africa today. Compliance by contracting parties with their legal obligations under the Ramsar Convention in respect of the sites in Table 3 will thus clearly benefit lion conservation. In practical terms, the Ramsar status of a site and the accompanying international obligations are likely to be distinct factors influencing range state authorities, including courts, when deciding whether to authorize certain development projects or other human uses within the site (Gardner et al. 2009). Allowing unsustainable levels of lion killing or bushmeat poaching would certainly be at odds with parties' obligations regarding conservation and 'wise use', especially so for sites where lions were part of the reasons for Ramsar-listing. The inclusion of a site on the Ramsar List thus provides a layer of protection, in addition to any designations of the area under national legislation or, indeed, other international instruments.

Added to this is a range of associated benefits, such as the development of (more rigorous) site management plans following listing and the attraction of additional funding. The latter can be pursued *inter alia* through the Small Grants Fund established in 1990 to aid developing countries in achieving wetland conservation and the sustainable development of local communities depending on wetlands. To illustrate, actions funded under this scheme have included the development of management plans and of measures to control wildlife harvesting, for instance patrol vehicles. Gardner et al. (2009) found that Ramsar-listing for 26 African sites has been instrumental in providing increased support for protection and management of the sites, scientific studies, funding opportunities, tourism, and poverty alleviation. Lastly, multinational corporations, while not legally bound by the terms of the Convention (only states can be contracting parties), can also self-impose commitments towards the conservation of Ramsar sites as part of their corporate social responsibility policies. For instance, in 2014 HSBC (one of the world's largest banking and financial services holdings) adopted a policy in which it instructs all its businesses to 'make appropriate enquiries and not knowingly provide financial services directly supporting projects which threaten the

special characteristics of UNESCO World Heritage Sites or Ramsar Wetlands' (HSBC 2014). The policy notes that the risks of such irresponsible investments are 'particularly high in the forestry, agriculture, mining, energy, property and infrastructure development sectors' (HSBC 2014).

From a lion conservation perspective it seems worthwhile, therefore, to make the most of the Ramsar Convention as it currently applies to lion habitat, and to promote the inclusion of further wetlands of importance to lions in the Ramsar List. Examples of such candidate sites for future Ramsar-listing include Usangu Flats and other wetland areas within Ruaha National Park in southern Tanzania, the importance of which is discussed below.

World Heritage Convention

Broadly similar considerations apply with regard to the other global site-based treaty, the UNESCO World Heritage Convention (WHC), the purpose of which is to conserve both cultural and natural heritage. Many ecologically important areas in Africa qualify as 'natural heritage' as understood in the Convention (Article 2), whereby 'outstanding universal value' from an aesthetic, scientific or conservation point of view is the common denominator. A selection of these sites has hitherto been included on the World Heritage List. Unlike the Ramsar Convention, decisions regarding the inclusion of sites are not made by individual states, but by the World Heritage Committee, the Convention's central decision-making body with a rotating membership of 21 states parties (Article 11). The first step to be made by a party is to draw up a 'Tentative List' of outstanding sites on its territory. From this inventory, it may then proceed to nominate individual sites formally, whereby it is for the nominating party to demonstrate the site's outstanding universal value. The nomination is evaluated by the IUCN in an advisory capacity, after which the World Heritage Committee takes the final decision whether to inscribe the site on the World Heritage List. Whereas most sites are within a single country, the List also includes a number of transboundary sites.

Each party 'will do all it can' to fulfill its 'duty of ensuring the identification, protection, conservation, presentation and transmission to future generations' of the natural heritage on its territory, 'to the utmost of its own resources' and, where appropriate, 'with any international assistance and co-operation' (Article 4). It is recalled in this regard that 'natural heritage' includes, but is not limited to, sites on the World Heritage List. Furthermore, to warrant that 'effective and active measures' are taken for the protection of the sites involved, the WHC requires that each contracting party 'shall endeavor, in so far as possible, and as appropriate for each country,' to 'take the appropriate legal, scientific, technical, administrative and financial measures necessary for the identification, protection, conservation, presentation and rehabilitation of this heritage,' and to 'integrate the protection of that heritage into comprehensive planning programmes' (Article 5). The Operational Guidelines of the WHC instruct parties to provide for a buffer zone when this is necessary for a site's proper conser-

vation (World Heritage Committee 2016). A World Heritage Fund (Article 15) is administered by the Committee to provide targeted assistance for the conservation of specific sites. The Committee also administers the List of World Heritage in Danger – the WHC equivalent of the Ramsar Convention’s Montreux Record – which flags sites that are ‘threatened by serious and specific dangers’ (Article 11(4)). Based on a broad mandate to oversee the implementation of the WHC, the World Heritage Committee regularly adopts decisions urging particular parties to adopt particular site-specific measures. As a last resort, the Committee may delete a site from the World Heritage List altogether.

World Heritage sites of importance to lions

Lions in various parts of Africa profit from the WHC, in a manner broadly similar to the Ramsar Convention. All of the 33 lion range states except Somalia are currently amongst the 193 contracting parties to the WHC (Table 2). Table 4 portrays 18 sites, in 15 range states, which are included in the World Heritage List and which are of actual or potential importance to lion conservation. Their locations are indicated in Figure 1. For many of these sites, lions are expressly mentioned in the listing justification. In the aggregate, the 18 sites cover a surface area of 174,630 km² (209,453 km² when including buffer zones). As with Ramsar, most sites (8 out of 18) are between 1,000 and 10,000 km². These include Virunga and Garamba National Parks in the DRC, Niokolo-Koba National Park in Senegal, Mana Pools/Sapi/Chewore in Zimbabwe, and the Ngorongoro Conservation Area in Tanzania – an area which has one of the highest densities of lions in the world. Four sites are smaller than 1,000 km², including the transboundary Mount Nimba Strict Nature Reserve in Côte d’Ivoire and Guinea, and the Kenya Lake System in the Great Rift Valley. Six of the listed sites are over 10,000 km² in size, including the Okavango Delta in Botswana, Serengeti National Park and Selous Game Reserve in Tanzania, and the recently designated trilateral W-Arly-Pendjari Complex in Niger, Benin and Burkina Faso – the latter site hosting the sole remaining lion population of significance in West Africa. Lions are (probably) gone from some of the sites listed in Table 4, such as Comoé National Park and Mount Nimba, but WHC protection can help keep options open for future reintroduction or recolonization by preserving lion habitat and prey. Seven of the sites in Table 4 are presently included in the List of World Heritage in Danger, while two further sites were temporarily Danger-listed in the past. It will be noted that various of the World Heritage sites in Table 4 partially or completely overlap with Ramsar sites, for instance Virunga National Park (DRC), the W-Arly-Pendjari Complex, the Okavango Delta (Botswana) and Mana Pools National Park (Zimbabwe). As for possible future World Heritage listings, Table 5 renders 26 sites which feature in the Tentative Lists of 14 range states, the successful nomination of which would appear beneficial to lions. Regarding Asiatic lions, the Gir Wildlife Sanctuary was nominated by India in the past, but the World Heritage Committee decided in 1992 that the site did not meet the strict criteria for inclusion in the List.

Table 4. Sites on the World Heritage List of importance to lion conservation. Whereas most of these sites currently have lions, some sites have been included from which lions have disappeared in the recent past. Map codes indicate the sites' geographic locations as shown in Figure 1. For more detailed information on each site, including the reasons for listing and precise location and delimitation, see <http://whc.unesco.org/en/list/>. B.z. = buffer zone; In danger = listing on List of World Heritage in Danger.

Country	World Heritage site	Size (ha)	Since	In danger	Map code
Botswana	Okavango Delta	2,023,590 + b.z. 2,286,630	2014	-	1
Central African Republic	Manovo-Gounda St Floris National Park	1,740,000	1988	1997-present	2
Côte d'Ivoire	Comoé National Park	1,150,000	1983	2003-present	3
Côte d'Ivoire & Guinea	Mount Nimba Strict Nature Reserve	18,000	1981	1992-present	4
Democratic Republic of the Congo	Virunga National Park	800,000	1979	1994-present	5
	Garamba National Park	500,000	1980	1984-1992 1996-present	6
Kenya	Lake Turkana National Parks	161,485	1997	-	7
	Mount Kenya National Park/ Natural Forest	202,334 + b.z. 69,339	1997	-	8
	Kenya Lake System in the Great Rift Valley	32,034 + b.z. 3,581	2011	-	9
Niger, Benin & Burkina Faso	W-Arly-Pendjari Complex	1,494,831 + b.z. 1,101,221	1996/ 2017	-	10
Senegal	Niokolo-Koba National Park	913,000	1981	2007-present	11
South Africa	iSimangaliso Wetland Park	239,566	1999	-	12
Uganda	Rwenzori National Park	99,600	1994	1999-2004	13
United Republic of Tanzania	Ngorongoro Conservation Area	809,440	1979	1984-1989	14
	Serengeti National Park	1,476,300	1981	-	15
	Selous Game Reserve	5,120,000 + b.z. 21,492	1982	2014-present	16
Zambia & Zimbabwe	Mosi-oa-Tunya / Victoria Falls	6,860	1989	-	17
Zimbabwe	Mana Pools National Park, Sapi and Chewore Safari Areas	676,600	1984	-	18

Using the WHC for lion conservation

In parallel to the discussion above regarding the Ramsar Convention, compliance by lion range states with their obligations under the WHC appears to render distinct advantages from a lion conservation perspective. For World Heritage sites with lions these obligations would include the prevention or mitigation of human-lion conflict and of prey depletion. Designation as World Heritage entails significant prestige, owing in part to the strict selection criteria and external designation process. This prestigious status puts real weight in the scales of governmental decision-making regarding activities potentially affecting listed sites. Likewise, the possibility of a site being stripped of its World Heritage designation is a significant incentive for states to comply with their commitments under

Table 5. Sites of importance to lion conservation on range states' tentative World Heritage lists. Whereas most of these sites currently have lions, some sites have been included from which lions have disappeared in the recent past. For more detailed information on each site, see <http://whc.unesco.org/en/tentativelists/>.

Country	Site on Tentative List	Since
Botswana	Chobe Linyanti System	2010
	Makgadikgadi Pans Landscape	2010
	Central Kalahari Game Reserve	2010
Cameroon	Parc National de Waza	2006
Chad	Parc National de Zakouma	2005
Ethiopia	Bale Mountains National Park	2008
Ghana	Mole National Park	2000
Kenya	Lake Nakuru National Park	1999
	Aberdare Mountains	2010
	The African Great Rift Valley – Hell's Gate National Park	2010
	The African Great Rift Valley – The Maasai Mara	2010
	The Great Rift Valley – The Kenya Lakes System	2010
	The Meru Conservation Area	2010
	Tsavo Parks and Chyulu Hills Complex	2010
Malawi	Nyika National Park	2000
	Vwaza Marsh Wildlife Reserve	2011
Mali	La Boucle du Baoulé	1999
	La Réserve de Biodiversité du Parc du Bafing Makana	2016
Namibia	Brandberg National Monument Area	2002
	Etosha Pan	2016
	Okavango Delta	2016
Niger	Zone Giraphe	2006
Nigeria	Gashaki-Gumti National Park	1995
Sudan	Dinder National Park	2004
Togo	Parc National de la Kéran et la Réserve de Faune Oti-Mandouri	2002
United Republic of Tanzania	Eastern Arc Mountains Forests of Tanzania	2006

the Convention. This possibility is a 'stick' at the disposal of the World Heritage Committee that the Ramsar Convention lacks. The Committee is also in a position to require that measures for a site's protection and management be in place *before* it is inscribed on the List – which again is a significant advantage over the Ramsar Convention's procedure.

Overall, the WHC adds a substantial layer of legal protection and a range of associated benefits in respect of listed sites. For an accessible overview and discussion of the benefits of the WHC for wildlife conservation generally we refer to Bertzky (2014). Here, we provide a few examples from the past to illustrate the different ways in which the WHC can serve lion conservation. In 1984, the World Heritage Committee decided to include the Ngorongoro Conservation Area in the List of World Heritage in Danger, after a lack of management had led to the site's overall deterioration. In subsequent years, thanks in part to the Committee's active engagement and technical cooperation projects, the situation improved and the site was removed again from the Danger List. More recently, the Tanzanian government reversed its plan to upgrade a

road bisecting the Serengeti National Park into a 'Serengeti Super Highway', under pressure from the World Heritage Committee and, in particular, from two rulings of the East African Court of Justice in 2014 and 2015. In the latter, the Court determined that upgrading the road would be contrary to Tanzania's environmental obligations under the EAC Treaty, while leaning heavily on the Serengeti's World Heritage status in reaching this verdict (Reference No. 9 of 2010, 20 June 2014; Appeal No. 3 of 2014, 29 July 2015). A final illustration concerns the role of multinational corporations. Whereas these are not bound by the WHC as such, an increasing number of them have undertaken 'no-go' commitments regarding sites on the World Heritage List. Besides the aforementioned HSBC policy, the International Council of Mining and Metals and oil companies like Shell, SOCO, Total and Tullow Oil have undertaken not to explore in or extract from World Heritage sites (<http://whc.unesco.org/en/extractive-industries>). That recurrent threats of mineral extraction activities in sites like Kenya's Lake Turkana and the DRC's Virunga National Park have to date been kept at bay has been due in large part to these sites' World Heritage status.

Evidently, the listing of a site on the World Heritage List or the Danger List does not as such guarantee conservation success. For example, despite its status as a World Heritage site since 1981 and its Danger-listing in 2007, Senegal's Niokolo-Koba National Park has experienced calamitous declines in prey populations, and concomitant declines in lion numbers (Henschel et al. 2014). The IUCN estimates the lion population has declined by 92%, from over 200 animals to only 16, between 1993 and 2014 (Bauer et al. 2016). Even so, the situation might have been even worse without the site's World Heritage status, and that status would also appear to increase the possibilities for promoting recovery.

On the basis of the foregoing, on the whole it appears sensible to seek out and use the existing opportunities for making the most of the WHC for lions occurring in extant World Heritage sites, and to actively work towards the future listing of tentative and other potential heritage sites of importance to lions. One significant candidate site, despite not being tentatively listed yet, is Ruaha National Park in southern Tanzania. This largest National Park in East Africa is the core protected area for the world's second largest lion population (Dickman et al. submitted; Riggio et al. 2012), and has very high levels of anthropogenic lion killing on its borders (Abade et al. 2014). However, it has long been over-looked in terms of its international importance, despite being highlighted as a Key Landscape for Conservation (KLC) by the European Commission (2016), and as a priority area in international and national lion action plans (IUCN 2006b; TAWIRI 2007). World Heritage listing could be a welcome improvement of its global recognition and protected status.

Lions as 'World Heritage species'

As an epilogue to this section, we draw attention to intermittent calls for the intergovernmental recognition of certain species of outstanding universal value as 'World Her-

itage species' (Wold 2008; Wrangham et al. 2008; Hance 2016). Whereas, conceptually, a good case can be made that lions – alongside other candidates like elephants, tigers and great apes – are species of 'outstanding universal value' and should be considered part of the world's common heritage, the WHC currently only provides a legal basis for declaring *sites*, not *species*, as World Heritage. Providing such a legal basis would require amendment of the WHC or the conclusion of a separate legal instrument dedicated to World Heritage Species (Wold 2008; see also Arthur 2014).

Convention on International Trade in Endangered Species (CITES)

With the sole remaining exception of newly independent South Sudan, all lion range states are currently parties to CITES (Table 2). The purpose of the Convention is to prevent species from being over-exploited through international trade by requiring its parties to impose restrictions on the international trade of plants and animals (and the parts and derivatives thereof) which belong to species, subspecies or populations listed on one of the CITES appendices. Restrictions are implemented through a system of permits, and the level of restriction corresponds with the level of danger faced by the species: Appendix I species are threatened with extinction and are therefore subject to a ban on international commercial trade (Article III); while trade in Appendix II species – which are not yet threatened with extinction, but may become so in the absence of trade regulation – is essentially permissible, provided that it is not detrimental to the species' survival (Article IV). Several types of specimens are exempted from CITES' usual restrictions, including, under certain (complex) conditions, 'personal or household effects', such as hunting trophies (Article VII(3); Res. Conf. 13.7 (Rev. CoP17)). Captive-bred animals belonging to Appendix I species are treated as if included in Appendix II (Article VII(4)). More tailored restrictions can be imposed through annotations to a species' listing, which define the scope of its inclusion in one of the appendices (Res. Conf. 11.21 (Rev. CoP17)).

While CITES' legal text is silent on the use of quotas to limit trade in listed species, the establishment of, and adherence to, quotas is an effective means of satisfying the Convention's requirement that trade not be detrimental. Quotas can be established by the COP through either annotation (for instance, the cheetah's listing is accompanied by an annotation which expresses annual export quotas for live specimens and hunting trophies from Botswana, Namibia and Zimbabwe) or resolution (for instance, Res. Conf. 10.14 (Rev. CoP16) recommends quotas for the harvest of leopards for export from 12 range states). More commonly, however, parties establish quotas unilaterally at the national level. Parties which fail to comply with their CITES commitments risk being penalized with trade suspensions (Res. Conf. 14.3), and, as also tends to be the case with other conservation treaties, parties to CITES are allowed to adopt domestic measures that are stricter than those required by the Convention (Article XIV(1)).

CITES, lion hunting trophies, and trade in lion bones and body parts

Given the international movement of hunting trophies and the increasing demand for lion bone and body parts, CITES clearly has a key role to play in protecting lions against overexploitation. That said, the divergence between lion population trends in certain southern African countries and those in the remainder of Africa, combined with the polarized nature of the trophy hunting debate (Bauer et al. 2015), have made it challenging for CITES' parties to agree on the extent to which trade should be permitted under the Convention. Since 1977, the Asiatic lion has been listed on Appendix I and the African lion populations on Appendix II. In addition, three range states (Guinea, Guinea-Bissau and Somalia) are currently subject to trade suspensions targeting all commercial trade in CITES-listed species – including lions (<http://cites.org/eng/resources/ref/suspend.php>). A growing number of parties, including Australia, the European Union and the United States, are imposing stricter domestic measures in respect of lions, ranging from more onerous import requirements than are prescribed by CITES to complete prohibitions on the import of hunting trophies from wild and/or captive-bred animals (CoP17 Prop.4; US Fish and Wildlife Service 2015; see also Macdonald 2016). Declared lion item exports for the period 2005–2014 numbered 29,214 items, of which 11,164 were wild sourced (although the definition of wild-sourced is ill-defined, creating some uncertainty); roughly two-thirds of these items were exported from South Africa – which has an active captive lion breeding industry (Williams et al. 2015) – with other exporters including Botswana, Ethiopia, Mozambique, Namibia, Tanzania, Zambia, and Zimbabwe (CoP17 Prop.4). Of these states, only three (Ethiopia, Mozambique and Zambia) appear to have notified the CITES Secretariat that they use national quotas as a means of ensuring the sustainability of lion exports (Table 6).

Proposals to up-list the African lion to Appendix I were submitted by Kenya in 2004 (CoP13 Prop.6) and by nine countries from West and Central Africa – all of which are either currently part of, or have historically belonged to, the lion's range – in 2016 (CoP17 Prop.4). In the Entebbe Communiqué, which preceded the 17th CITES COP in the same year, range states highlighted the importance of considering the latter proposal against the relevant CITES listing criteria. They further recognized that:

'Lion Range States have different views on the inclusion of all African populations of *Panthera leo* in Appendix I, with some arguing that the populations in West and Central Africa are fragmented and highly threatened; and others arguing that the species does not meet the listing criteria and is threatened by factors other than those CITES can address.'

Following the subsequent negotiations during the 17th CITES COP, the African lion was ultimately retained on Appendix II. A new annotation was, however, added to the Appendix II listing, which sets a zero annual export quota for 'specimens of bones, bone pieces, claws, skeletons, skulls and teeth removed from the wild and traded for commercial purposes', but allows the trade of specimens of bones etc. derived from South Africa's captive breeding operations, provided that national export quotas are es-

Table 6. Unilaterally-set quotas for the export of *Panthera leo* specimens. Data from <http://www.cites.org/eng/resources/quotas/index.php>.

Range State	Year	Quantity	Type of specimen
Ethiopia	2017	10	trophies
	2016	10	
	2015	10	
	2014	10	
	2013	5	
	2012	10	
	2011	10	
	2009	20	
	2008	20	
	2007	20	
		80	skins
	2006	20	trophies
		80	skins
	2005	20	trophies
		80	skins (confiscated)
	2004	20	trophies
		80	skins
	2003	12	trophies
	2002	30	trophies
	2001	15	live & trophies
	2000	10	live & trophies
Mozambique	2017	54	trophies, wild taken
	2016	54	
	2015	60	
	2014	53	wild taken
	2013	50	
	2012	50	
Zambia	2017	24	wild taken
	2016	24	

tablished and communicated to the CITES Secretariat. South Africa has set an export quota at 800 lion skeletons (Department of Environmental Affairs 2017). The concern remains that allowing any trade of lion parts is potentially problematic from an enforcement point of view and has the potential to stimulate demand, and thus poaching (Williams et al. 2015). In this regard, the COP retains the discretion to amend this annotation in the future so as to provide for a more uniform treatment of lion parts regardless of their origin, or to include further conditions in respect of permissible trade. It could, for instance, be required that the proceeds of trade be used for lion conservation and development initiatives benefiting rural communities in lion range, thus assisting in the mitigation of human-lion conflict. A precedent for the latter approach was set by the annotations restricting trade in elephant ivory.

In addition to its inclusion of a new annotation on the international trade of lion parts, the 17th CITES COP adopted a series of decisions on the African lion (discussed below), as well as a resolution on trade in hunting trophies (Res. Conf. 17.9), which seeks to strike a balance between recognizing the potential benefits of trophy hunting and preventing this practice from occurring at unsustainable levels. In the resolution, the COP recognizes that ‘well-managed and sustainable trophy hunting is consistent with and contributes to species conservation, as it provides both livelihood opportunities for rural communities and incentives for habitat conservation, and generates benefits which can be invested for conservation purposes.’ At the same time, the COP agrees that (even when treated as a personal or household effect) the export of hunting trophies should generally be conditional upon the issuance of an export permit, and thus the making of a non-detriment finding. The resolution further provides guidance on the sustainable management of trophy hunting, and recommends, *inter alia*, that parties ‘consider the contribution of hunting to a species’ conservation and socio-economic benefits, and its role in providing incentives for people to conserve wildlife, when considering stricter domestic measures and making decisions relating to the import of hunting trophies’.

Under the current Appendix II listing, African states are limited in the types of lion specimens that they may export for commercial purposes, and a party which allows trade to occur at levels that are detrimental to the species’ survival will be in breach of its CITES commitments. Were all African lion populations ever to be moved to Appendix I in the future, the types of trade allowed by the Convention would become even more constrained. However, barring additional restrictions through annotations or stricter domestic measures, trade in captive-bred lions could continue for commercial purposes. Moreover, as illustrated by CITES’ approach to cheetahs and leopards – both of which appear on Appendix I – the continued export of hunting trophies would also be possible, provided that this is not detrimental to the survival of the population involved. An alternative approach could be to retain some countries’ lion populations on Appendix II, while shifting the remainder to Appendix I. The COP has already allowed such ‘split-listing’ for two other members of Africa’s ‘Big 5’ – the African elephant (*Loxodonta africana*) and the white rhinoceros (*Ceratotherium simum*) – in order to accommodate the trade of animals from certain well-managed populations of these species in southern Africa (see e.g. Lewis 2009). The COP has also, however, cautioned that split-listing should generally be avoided ‘in view of the enforcement problems it creates’ (Res. Conf. 9.24 (Rev. CoP17)).

The CITES Animals Committee is tasked with conducting ‘periodic reviews’ of the species appearing in the Convention’s appendices, with the purpose of advising the COP on whether particular species are appropriately listed, based on current biological and trade information in light of the applicable listing criteria (Res. Conf. 14.8 (Rev. CoP17)). *Panthera leo* was included in this process in 2011 and, in 2014, a draft review (suggesting that the African lion’s Appendix II listing remained appropriate (AC27 Doc. 24.3.3)) was presented to the Committee, which considered it necessary to incorporate information from the lion’s 2015 IUCN Red List Assessment before finalizing the

document. The review had not been finalized by the 17th COP in 2016, at which stage the need for its completion fell away as a result of the COP making a decision on the lion's proposed up-listing (CoP17 Doc. 82.2). Notably, the CITES COP's decision not to uplist the lion was influenced by the fact that international trade is not the primary threat faced by the species and that what is needed are consequently not trade bans but cooperative measures between range states (UNEP/CMS/COP12/Doc.24.3.1.3).

CITES, enforcement issues, and the broader lion conservation agenda

As is highlighted by the COP's concerns regarding split-listing, CITES' trade controls clearly cannot be effective unless implemented and enforced (Wandesforde-Smith 2016; Zhou et al. 2016). This is true regardless of the appendix on which a species/population finds itself. Indeed, in 2002 the CITES COP recognized that, despite the Appendix I listing of all Asian big cat species (including the Asiatic lion), illegal trade in these species had escalated and continued to threaten their survival. The COP therefore called for a variety of legislative and enforcement measures to address this situation (Res. Conf. 12.5 (Rev. CoP17)). For Africa's populations of *Panthera leo*, it is worrying that 23 of the range states that are parties to the Convention have been assessed as having inadequate legislation for the effective implementation of CITES (Table 7; see also Watts 2016). Improvements are clearly desirable in this regard, as are measures to enhance the capacity of African states to implement and enforce those laws that do exist (Wandesforde-Smith 2016).

The COP17 decisions on the African lion (Decisions 17.241–245) make no explicit mention of strengthening national CITES-implementation legislation, but call for a wide array of measures to improve the conservation and management of this 'iconic species', many of which are clearly responses to the Entebbe Communiqué. Notably, these CITES COP decisions have also been endorsed by the CMS Standing Committee and will be presented to the CMS COP for adoption in October 2017 (UNEP/CMS/COP12/Doc.24.3.1.3). The decisions direct the CITES Secretariat, subject to external funding and in collaboration with African lion range states, the CMS and the IUCN, to, *inter alia*, 'investigate possible mechanisms to develop and support the implementation of joint lion conservation plans and strategies, taking into consideration existing lion conservation plans and strategies' (the IUCN's 2006 regional Lion Conservation Strategies clearly being significant in this regard); and to take a variety of measures concerning capacity building for joint conservation plans, further international cooperation, ecological and trade research, information-sharing, and education.

Further, the abovementioned decisions direct the CITES Standing Committee to establish a Task Force on African lions, and to consider establishing a trust fund to attract funding for both the work of the Task Force and the implementation of conservation and management plans and strategies for the African lion. Two initiatives which seek to defeat wildlife crime in Africa, and whose participation in, or collaboration with, the African Lion Task Force thus appears to be appropriate, are

Table 7. Status of CITES implementation legislation. Data from <http://www.cites.org/eng/legislation>, last updated 01/09/2016.

Category	Range state(s)
Category 1 <i>Believed generally to meet all requirements for effective CITES-implementation</i>	Cameroon, Democratic Republic of Congo, Ethiopia, Namibia, Nigeria, Senegal, South Africa, Zimbabwe
Category 2 <i>Believed generally to meet some requirements for effective CITES-implementation</i>	Benin, Botswana, Burkina Faso, Chad, Guinea, India, Kenya, Malawi, Mali, Mozambique, Sudan, Togo, United Republic of Tanzania, Zambia
Category 3 <i>Believed generally not to meet any requirements for effective CITES-implementation</i>	Angola, Central African Republic, Côte d’Ivoire, Ghana, Guinea-Bissau, Niger, Rwanda, Somalia, Swaziland, Uganda
Non-party	South Sudan

the Lusaka Agreement Task Force (established by the 1994 Lusaka Agreement) and the Horn of Africa Wildlife Enforcement Network. Between them, these initiatives presently cover seven lion range states: Ethiopia, Kenya, South Sudan, Sudan, Tanzania, Uganda and Zambia. A final point concerning enforcement is that the 17th CITES COP also adopted a resolution on demand reduction strategies as a means of combatting illegal wildlife trade (Res. Conf. 17.4), prompting some delegates to question whether it is possible to simultaneously reduce demand for illegal products and promote the consumption of legal ones, as the resolution on trophy hunting appears to do (IISD 2016).

Despite its imperfect implementation record and the challenges it faces in balancing calls for preservation with those for sustainable use (Wandesforde-Smith 2016), CITES has a demonstrated potential to make a tangible difference to the conservation of species threatened by trade. For instance, the conservation status of jaguars (*Panthera onca*) and other South American felids notably improved after the CITES ban on trade in their pelts took effect in 1975 (Di Marco et al. 2014). Regarding lions, the least that can be said is that the relevance of CITES to the conservation and sustainable use of the species is likely to stay on the increase for some time to come. However, due to the Convention’s narrow focus on trade, and trade not being amongst the primary concerns for lion conservation, CITES provides a necessary but not a sufficient international framework for lion conservation.

Convention on Migratory Species (CMS)

The CMS broadly addresses the conservation of migratory species, and like CITES also lists species in appendices. The Convention supports the conservation and management of migratory species by requiring that parties take specified conservation measures in respect of species in CMS Appendix I; by promoting the development of targeted ancillary instruments, for CMS Appendix II species in particular; and by pro-

viding a variety of less formal mechanisms for targeting conservation activity towards particular groups of species or addressing particular cross-cutting threats.

The Convention defines ‘migratory species’ to mean ‘the entire population or any geographically separate part of the population of any species or lower taxon of wild animals, a significant portion of whose members cyclically and predictably cross one or more national jurisdictional boundaries’ (Article I(1)(a)). This definition allows the Convention to attach different legal commitments to different populations of the same species, and only encompasses wild animals, thus failing to regulate parties’ activities in respect of animals bred in captivity. Further, the CMS COP has taken a remarkably flexible approach in interpreting the definition, having accepted that taxa which periodically traverse (or have historically traversed) national borders are ‘migratory species’, even if the reason for these movements is simply that their ranges are transboundary (Trouwborst 2012). The lion is a case in point. Moreover, lions can disperse over large distances and some of them migrate along with their migratory prey. In both cases they may traverse international boundaries (UNEP/CMS/COP12/Doc.25.1.3). However, the Asiatic lion currently lacks such transboundary features. At any rate, the COP has explicitly recognised that ‘*Panthera leo* ... and all its evolutionarily significant constituents, including *Panthera leo persica*, satisfy the Convention’s definition of “migratory species”’ (CMS COP Resolution 11.32, 2014).

Listing lions under the CMS

While CMS Appendix I lists ‘endangered’ migratory species (Article III(1)), Appendix II is dedicated to migratory species which have an unfavourable conservation status and require international agreements for their conservation and management, as well as species whose conservation status, though not necessarily unfavourable, would significantly benefit from an international agreement (Article IV(1)). At a 2010 meeting of the Convention’s Scientific Council, Congo, being interested in CMS support for lion reintroduction efforts, raised the possibility of an Appendix II listing (UNEP/CMS/ScC16REPORT). In 2014, Kenya submitted a proposal to include the Asiatic lion on Appendix I and all other subspecies on Appendix II, which was subsequently revised to propose that all populations of *Panthera leo* be listed on Appendix II (UNEP/CMS/COP11/Doc.24.1.2/Rev.1). Kenya’s proposal was ultimately withdrawn, but the COP adopted Resolution 11.32, which *inter alia* requested consultations between range states concerning the population status of *Panthera leo*, and invited range states, subject to the findings of such consultations, to work towards an Appendix II listing proposal to be presented to the 12th CMS COP in October 2017. Subsequently, in the Entebbe Communiqué, range states recognized that the ‘CMS can provide a platform to exchange best conservation and management practices; support the development, implementation and monitoring of action plans; promote the standardization of data collection and assessments; facilitate transboundary cooperation; and assist in the mo-

bilization of resources.’ Many range states additionally indicated that they would be in favour of an Appendix II listing, although southern African states expressed doubt as to whether their lion populations should be included therein. In accordance with Resolution 11.32, COP12 is indeed set to consider a proposal for listing the lion in Appendix II, which was submitted jointly by Chad, Niger and Togo. The proposal, *inter alia*, describes how lions may cross national jurisdictional boundaries as part of their circadian cycles, life cycles, and annual cycles; and identifies countries which share lion populations that are suspected to cyclically and predictably traverse national boundaries, such that a significant portion of Africa’s lion population can be considered ‘migratory’ for CMS purposes (UNEP/CMS/COP12/Doc.25.1.3).

Support for listing lions on CMS Appendix II has also been expressed in the recent literature (Trouwborst 2015a; Watts 2016), and would certainly fit the pattern of prior CMS practice and recent listing trends. The CMS appendices already include the large carnivore species cheetah and snow leopard (*Panthera uncia*) in Appendix I, and African wild dog and polar bear (*Ursus maritimus*) in Appendix II. The listing proposals that will be considered by CMS COP12 include two further carnivores besides the lion – leopard and Gobi bear (*Ursus arctos isabellinus*) – as well as other African megafauna – chimpanzee (*Pan troglodytes*), giraffe (*Giraffa camelopardalis*) and African wild ass (*Equus africanus*).

In its most recent guidance on assessing proposals to list species on the Convention’s appendices, the CMS COP has advised, *inter alia*, that a taxon assessed as ‘Extinct in the Wild’, ‘Critically Endangered’, ‘Endangered’, ‘Vulnerable’ or ‘Near Threatened’ using the IUCN Red List criteria satisfies the Convention’s definition of ‘unfavourable conservation status’ and is thus eligible for consideration for Appendix II listing; and that a taxon assessed as falling into one of the first three of these categories is eligible for consideration for listing in Appendix I (Resolution 11.33, 2014). Given their current Red List categorisations, the Asiatic lion and the West African lion are thus eligible for CMS Appendix I listing, while the remainder of *Panthera leo* is eligible for Appendix II listing. Red List status is not, however, the only relevant consideration. The COP has also accepted that listing should only occur if this is expected to result in conservation benefits, and has further highlighted the need to consider listing proposals’ ‘coherence with existing measures in other multilateral fora’ (Resolution 11.33). It is permissible for species to be listed simultaneously in both Appendices I and II (Article IV(2)). Should a species that has only been listed in Appendix II decline to the extent that it becomes endangered, a subsequent Appendix I listing would of course be a possibility – though by no means a certainty given the COP’s pragmatic approach to listing. Indeed, 73% of the taxa listed under the Convention appear only in Appendix II (<http://www.cms.int/en/species>).

At any rate, were any populations of *Panthera leo* to be included in CMS Appendix I, all states belonging to these populations’ current range would become subject to certain conservation commitments. Although the Convention does not require that states in which a species is extinct take measures to facilitate its return, any state to

which the species is reintroduced or which the species (re)occupies spontaneously will, at that stage, become subject to the same legal requirements as other range states. These include the requirement that states endeavour to take measures to conserve and restore the species' habitat and address factors which impede its migration or otherwise endanger the species (Article III(4)); as well as the requirement that taking of animals belonging to the species be prohibited (Article III(5)). 'Taking' in this context includes 'taking, hunting, ... capturing, harassing, deliberate killing, or attempting to engage in any such conduct' (Article I(1)(i)). On the face of it, the requisite taking prohibition is extremely far reaching, encompassing everything from trophy hunting, to killing for damage control, to capture for the purposes of research or translocation. The Convention does, however, allow for certain exceptions – including for scientific purposes, propagation, traditional subsistence use, or where 'extraordinary circumstances so require' (Article III(5)). These offer CMS parties a measure of flexibility and could conceivably even be relied upon to justify limited trophy hunting, provided that this is strictly controlled and does not operate to the species' disadvantage. That said, the CMS COP has shown a preference for range states in which sustainable taking is possible to request exclusions from Appendix I listing, rather than to rely upon the Convention's exemptions provision (see e.g. Resolution 10.28 on the Saker falcon, *Falco cherrung*). Unsurprisingly, there have thus been instances in which the conservation benefits associated with hunting have been relied upon to argue that Appendix I listing will not be to a population's benefit. For instance, in its assessment of Kenya's proposal to list the African lion on Appendix II, the CMS Scientific Council accepted that, despite the West African lion's IUCN categorisation as Critically Endangered, an Appendix II listing seemed the most appropriate course of action, given stakeholders' belief that a ban on regulated taking would be 'harmful to the conservation of this taxon' (UNEP/CMS/COP11/Inf.8).

Further arguments against certain species' Appendix I listing have been based on the permissibility of trade under CITES. For instance, in 2009, three countries' cheetah populations were excluded from the species' listing on CMS Appendix I because quotas for trade in these populations are permitted under CITES (UNEP/CMS/COP9/REPORT). Including the African lion in CMS Appendix I would not interfere with South Africa's trade in parts from captive-bred animals. However, such uplisting would present difficulties for states which permit trophy hunting of wild lions. Indeed, during the Scientific Council's 2010 discussion of the possibility of listing the African lion in one of the CMS appendices, the CITES representative highlighted that a CMS Appendix I listing would raise similar concerns about CITES-compatibility to those encountered when listing the cheetah (UNEP/CMS/ScC16REPORT). Eight of the lion's range states, including states where trophy hunting is practiced, such as Namibia, are not currently parties to the CMS (Table 2) and therefore would not incur any legal obligations from an Appendix I listing unless they were to ratify the Convention. Caution should therefore be taken to consider the positions of these states when making listing decisions regarding commercially valuable species so as not to *deter* them from

becoming parties to the Convention. Notably, Botswana, despite being a non-party, has expressed its support for the CMS Appendix II listing of the African lion (UNEP/CMS/COP12/Doc.25.1.3). Insofar as the Asiatic lion is concerned, a CMS Appendix I listing would in fact *complement* CITES' ban on the commercial trade of animals belonging to this subspecies.

CMS ancillary instruments and lions

While the CMS's substantive conservation requirements only apply in respect of Appendix I species, the Convention also promotes the development of ancillary instruments, which prescribe detailed conservation measures in respect of particular species or groups of species and provide institutional platforms for coordinating, and reviewing progress towards achieving, such measures. Parties to the Convention must endeavour to conclude legally binding 'AGREEMENTS' for the conservation and management of Appendix II species (Article II(3)(c)), giving priority to species with an unfavourable conservation status (Article IV(3)). CMS parties are further encouraged to conclude 'agreements' in respect of taxa whose members 'periodically cross one or more national jurisdictional boundaries' (Article IV(4)). The latter 'agreements', which offer considerably greater flexibility in terms of scope, content and format, have thus far taken the form of either treaties or non-binding memoranda of understanding (MoUs). Institutional structures vary from one instrument to the next, but generally include a management forum (periodic meetings of the parties/signatories), coordination support (whether provided by the CMS Secretariat, an independent Secretariat, or a specific state or non-governmental organization), and some form of scientific/advisory forum (Lee et al. 2010). However, while the legally binding instruments have the stability provided by core funding, the MoUs by contrast depend 'exclusively on voluntary contributions which could be withdrawn or not materialize at any time' (Lee et al. 2010).

Were *Panthera leo* or any of its populations to be listed on Appendix II, it would be possible and in accordance with the Convention to develop a binding AGREEMENT, whose membership would be open to all range states, regardless of whether they are CMS parties (Article V(2)). Such an instrument could potentially also incorporate other large carnivores with overlapping ranges – the African wild dog being an especially obvious candidate, given its current Appendix II listing and unfavourable conservation status (Trouwborst 2015a). Alternatively – and *regardless* of whether the lion is ultimately listed on either of the CMS appendices – Article IV(4) would allow the development of a treaty or MoU focused either exclusively on lions or more broadly on the conservation and management of transboundary large carnivore populations throughout Africa and/or Asia (or portions thereof).

On the one hand, there are distinct advantages to providing such a formal, high-profile and permanent platform in the form of an ancillary instrument, and doing so

would be in line with the Convention's provisions. On the other hand, the development and functioning of a new ancillary instrument entails administrative and financial burdens. As with any international legal instrument, this can be expected to influence states' willingness both to initiate the development of, and become parties or (in the case of an MoU) signatories to, such an instrument. Given the urgent need to direct resources towards *in situ* conservation efforts, states are likely to be especially hesitant to develop a new instrument, with an independent administrative and/or decision-making structure, if they consider it possible to achieve their objectives under existing legal and institutional frameworks. Indeed, in the face of resource constraints, the CMS COP has recognized the need to avoid an unwarranted proliferation of ancillary instruments and has adopted criteria against which to assess proposals for the development of new instruments (Resolution 11.12, 2014). One such criterion, quite sensibly, is the absence of superior alternatives – either outside the CMS system or within it.

CMS Concerted Actions and lions

One type of alternative remedy within the CMS system is the establishment, through resolution, of 'Concerted Actions' to improve the conservation status of specified Appendix I and II species, the implementation of which is monitored by the Convention's Scientific Council (Resolution 10.23, 2011). Concerted Actions may operate on a single- or multi-species basis and the COP has accepted that they may act as either a precursor or alternative to the conclusion of a dedicated treaty or MoU (Resolution 11.13, 2014). The Scientific Council has recognized that, if listed on either of the CMS appendices, the lion would be an appropriate species for Concerted Action (UNEP/CMS/COP11/Inf.8).

In addition, portions of the lion's present and historic range are already encompassed by two existing, geographically-based, multi-species Concerted Actions: the Sahelo-Saharan Megafauna Concerted Action and the Central Eurasian Aridland Mammals Concerted Action. The species on which these Concerted Actions are initially centred include two species of large carnivores – snow leopard and cheetah – and the COP's intention is that they 'will in due course cover all threatened migratory large mammals of the temperate and cold deserts, semi-deserts, steppes and associated mountains' of the Sahelo-Saharan region and Central Eurasia (Recommendations 9.1 and 9.2, 2008). Importantly for the Asiatic lion, the COP has requested the Scientific Council and the Secretariat to 'ensure that all means that can effectively contribute to an improvement of the conservation status of Asian big cats and to awareness raising on the threats they face are taken within the framework of the Central Eurasian Aridland Mammals Concerted Action' (Recommendation 9.3, 2008). Lion populations not falling within the geographic scope of the existing multi-species Concerted Actions could theoretically be covered by a Sub-Saharan Megafauna Concerted Action, the establishment of which has already been identified as a possibility by the CMS Scientific Council (UNEP/CMS/COP11/Inf.8).

CMS Action Plans, Special Species Initiatives and lions

Species action plans can play a key role in operationalizing Concerted Actions. However, such plans can also be developed, or existing plans endorsed (the regional Lion Conservation Strategies being potential candidates), within other contexts within the CMS regime. So can international working groups to monitor and support their implementation. A further available mechanism takes the form of ‘Special Species Initiatives’, the prime example being the Central Asian Mammals Initiative (CAMI). The CAMI and its associated Programme of Work, the implementation of which is coordinated by the CMS Secretariat, act as a common strategic framework for action, drawing together the various CMS instruments and mandates of relevance to the species involved (Resolution 11.24, 2014). The establishment, in collaboration with the CITES Secretariat, of a similar initiative for African carnivores will be proposed at this year’s CMS COP. It is envisaged that this Joint CMS-CITES African Carnivores Initiative will be used to develop both ‘concrete, coordinated and synergistic conservation programmes’ and ‘policy guidance and recommendations’; and to ‘organize the collaboration with other conservation initiatives and organizations’ (UNEP/CMS/COP12/Doc.24.3.1.1). While the CAMI focuses primarily on Concerted Action species, four of the 15 species it covers are not listed on the CMS Appendices. This suggests that it would be possible for the Asiatic lion to be incorporated into the Initiative, even without CMS listing. It similarly suggests the possibility of the anticipated African Carnivores Initiative to encompass not only listed, but also non-listed species.

Flexibility and limited resource demands are amongst the advantages of Concerted Actions and Special Species Initiatives, and securing the initial participation of states may also be easier than with a binding ancillary instrument. Conversely, compared to an ancillary treaty, it may be harder to maintain states’ commitment and to monitor implementation over time, due to a lack of core funding, a dedicated institutional structure and ‘legal teeth’.

As a final and more general point, whereas it is clear from the above that the CMS regime offers certain options for directing conservation action towards *non*-listed species, listing the lion on either or both of the Convention’s appendices would raise the species’ profile and would significantly increase the likelihood of lions being afforded priority within the Convention’s busy agenda. Indeed, the CMS Secretariat has observed that it may not be justifiable to dedicate the Convention’s limited resources to supporting the conservation of an unlisted species (UNEP/CMS/COP12/Doc.24.3.1.3).

Convention on Biological Diversity (CBD)

All 33 lion range states are contracting parties to the CBD, which aims broadly for the conservation and sustainable use of biological diversity, including at the ecosystem, species and genetic level. The Convention lacks lists of species requiring special atten-

tion. Regardless, many of the duties it spells out are of plain relevance to lions. These include obligations regarding national biodiversity strategies, plans or programmes (Article 6), *in-situ* conservation (Article 8), sustainable use (Article 10) and environmental impact assessment (Article 14). To single out one of these, Article 8 requires each party, ‘as far as possible and as appropriate’, *inter alia* to establish a ‘system of protected areas or areas where special measures need to be taken to conserve biological diversity’, ‘[p]romote the protection of ecosystems, natural habitats and the maintenance of viable populations of species in natural surroundings’, ‘[r]ehabilitate and restore degraded ecosystems and promote the recovery of threatened species’, and ‘[d]evelop or maintain necessary legislation and/or other regulatory provisions for the protection of threatened species and populations’. Whereas the above provisions are just as binding as other treaty obligations, they are phrased in such a broad and qualified manner that it is difficult in practice to identify the boundary between compliance and violation. Parties evidently dispose of an ample margin to determine what, in their individual circumstances, is ‘possible’ and ‘appropriate’, although this discretion is not limitless. For instance, allowing a species to go extinct on its territory is clearly hard to reconcile with a state’s obligations under the CBD.

For present purposes, the CBD is also of significance as a high-profile forum for signaling, discussing, and sharing information and experience regarding all manner of conservation issues; as a catalyst for mainstreaming the consideration of biodiversity into broader policy agendas; and as a source of non-binding but authoritative guidance as developed and endorsed by the CBD COP. Most of the strategic ‘Aichi Biodiversity Targets’ adopted by the COP in 2010, for instance, are relevant to lion conservation, such as the 12th: ‘By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained’ (CBD Strategic Plan for Biodiversity 2011–2020). Also of evident relevance are the 2004 ‘Addis Ababa Principles and Guidelines for the Sustainable Use of Biodiversity’, according to which it is ‘possible to use biodiversity components in a manner in which ecological processes, species and genetic variability remain above thresholds needed for long-term viability,’ while ‘all resource managers and users have the responsibility to ensure that use does not exceed these capacities’ (CBD COP Decision VII/12, 2004).

Given the threat posed by depletion of lions’ prey base, the CBD’s active role in addressing the unsustainable use of bushmeat is particularly relevant. The Convention’s Liaison Group on Bushmeat has developed specific recommendations to complement the Addis Ababa Principles and Guidelines in this regard, which have been endorsed by the CBD COP (CBD COP Decisions XI/25, 2012, and XII/18, 2014), and also by the CITES COP (Res. Conf. 13.11(Rev. CoP17)). The CBD COP has urged parties to develop and promote methods and systems, and build capacity and community awareness ‘to determine sustainable wildlife harvest levels at national and other levels, with a particular view to monitoring and improving sustainable wildlife management and customary sustainable use,’ and to develop and promote ‘sustainable alternatives to the unsustainable use of wildlife’ (CBD COP Decision XI/25, 2012). Bushmeat is

furthermore addressed in a volume of the CBD Technical Series (Nasi et al. 2008) and, pursuant to COP Decision XI/25, a Collaborative Partnership on Sustainable Wildlife Management (CPW) was established, which has developed a sourcebook on bushmeat. Notably, the CPW's 14 members include both CITES and the CMS, and the latter's 2017 COP will consider the adoption of several draft decisions on addressing the unsustainable use of wild meat (UNEP/CMS/COP12/Doc.24.4.7).

Regional instruments

In addition to the global conventions considered above, here we summarize several relevant regional agreements, although we stress that this concise treatment does not necessarily reflect a lesser practical importance of these instruments to lions.

African Convention

The 1968 African Convention, administered by the African Union, is in force for 21 lion range states (Table 2). Notably, Botswana, Namibia, South Africa and Zimbabwe are not amongst its contracting parties. The lion – alongside six other large carnivores – is listed as a protected species in the Annex to the Convention. Consequently, contracting parties are under an obligation to ensure that lions are 'totally protected' throughout their territories, which includes prohibiting their hunting, killing and capture (Article VIII). As lions are subject to the flexible 'Class B' regime, this prohibition may be lifted 'under special authorization' at the discretion of the 'competent authority'. The Convention places restrictions on certain means of capture and killing, including a prohibition on the use of poisoned baits (Article VII). Trade in lions and lion trophies must be regulated, and their export, import and transit made subject to an authorization 'which shall not be given unless the specimens or trophies have been obtained legally' (Article IX). Regarding lion habitat, the Convention requires parties to maintain, expand and/or newly establish 'conservation areas' – a term covering 'strict nature reserves', 'national parks' and 'special nature reserves' – so as to 'ensure conservation of all species and more particularly of those listed ... in the annex' (Article X(1)). Concerning the peripheries of such protected areas, parties 'shall establish, where necessary, around the borders of conservation areas, zones within which the competent authorities shall control activities detrimental to the protected natural resources' (Article X(2)).

The African Convention appears to have contributed to the increase in protected areas and improvements in national hunting and wildlife trade legislation in many lion range states during the years following the Convention's adoption (Bowman et al. 2010). Unfortunately, however, the failure of the Convention's drafters to establish a COP or similar institutional framework to oversee and promote implementation and enforcement has made the 1968 African Convention something of a 'sleeping treaty'

(Bowman et al. 2010). A substantially revised version of the Convention – including an institutional framework but lacking a species-specific focus – was negotiated in 2003, but requires a further two ratifications to enter into force.

Bern Convention

The Bern Convention, the Council of Europe's counterpart of the African Convention, is something of an oddity in the current review. Notwithstanding its primary focus on European wildlife, as reflected in its title, in certain ways the geographic scope of the Convention extends beyond Europe. Without going into the particulars (see Bowman et al. 2010), we note here that the Bern Convention has a small number of African states parties, including two lion range states, Burkina Faso and Senegal. The lion itself is not listed under the Convention – although leopard, tiger (*Panthera tigris*) and dhole (*Cuon alpinus*) are (see also Trouwborst 2017). Still, it would seem that the general obligation in Article 2 of the Bern Convention requires Burkina Faso and Senegal to 'take requisite measures to maintain the population of [lions] at, or adapt it to, a level which corresponds in particular to ecological, scientific and cultural requirements' – i.e., a level at which the population is not threatened with extinction (Bowman et al. 2010; Trouwborst et al. 2017b). Interestingly, in 2005 the Standing Committee (the Bern Convention's COP equivalent) called for increased international cooperation regarding transboundary populations of large carnivores, including: 'Lion (*Felis leo*) and leopard (*Panthera pardus*) in the National Park of Niokolo Koba (Senegal) and Mali' (Standing Committee Recommendation No. 115, 2005). Overall, however, the relevance of the Bern Convention to lion conservation appears to have been marginal at best, and there are no indications for this to radically change in the foreseeable future.

SADC Protocol on Wildlife Conservation and Law Enforcement

The SADC covers the large region from the tip of South Africa to the DRC and Tanzania in the north. The SADC Protocol on Wildlife Conservation and Law Enforcement is currently in force for eight lion range states (Table 2), and could in future apply to a further three range states once they ratify (Angola, DRC, Swaziland). The Protocol is intended to provide 'common approaches to the conservation and sustainable use of wildlife resources and to assist with the effective enforcement of laws governing these resources' (Article 4(1)), whereby 'wildlife' is defined as 'animal and plant species occurring within natural ecosystems and habitats' (Article 1). Some of the Protocol's specific objectives are to promote sustainable wildlife use; harmonize relevant legal instruments; assist in national and regional capacity-building for wildlife conservation, management and law enforcement; facilitate community-based management practices; and to promote conservation of shared wildlife populations through the establishment of TFCAs (Article 4(2)). To achieve these objectives, the Protocol lays down a range of obligations, accompanied by an institu-

tional framework. The latter includes a Committee of Ministers, a Committee of Senior Officials, a Technical Committee composed of the Directors of countries' wildlife agencies, and a 'Wildlife Sector Technical Coordinating Unit' acting as Secretariat (Article 5).

Whereas the Protocol does not contain species-specific provisions, many obligations are of significance from a lion conservation perspective. For instance, each contracting party 'shall ensure the conservation and sustainable use of wildlife resources under its jurisdiction' (Article 3(1)). To that end, parties 'shall adopt and enforce legal instruments' (Article 6(1)) and 'assess and control activities which may significantly affect the conservation and sustainable use of wildlife so as to avoid or minimise negative impacts' (Article 7(2)). Parties shall take measures to 'ensure the maintenance of viable wildlife populations' and prevent over-exploitation, including by regulating the taking of wildlife through 'restrictions on the number, sex, size or age of specimens taken and the locality and season during which they may be taken' (Article 7(3)). Regarding transboundary populations, parties shall, as appropriate, 'establish programmes and enter into agreements to promote the co-operative management of shared wildlife resources and wildlife habitats across international borders' (Article 7(5)), and generally 'promote the development of transfrontier conservation and management programmes' (Article 7(9)). Likewise, parties are to 'endeavour to harmonise national legal instruments governing the conservation and sustainable use of wildlife resources' (Article 6). A particularly important instrument to further the coordination and harmonization of the management of transboundary wildlife populations and ecosystems is the establishment of TFCAs (discussed below). Lastly, we highlight the development of thematic international strategies developed within the framework of the SADC Protocol, such as the SADC Law Enforcement and Anti-Poaching Strategy 2016–2021.

In sum, the relevance of the Protocol to ensuring conservation and sustainable use of lions in the SADC region is evident. We do draw attention to the difficulties involved in implementing the various objectives and obligations in the Protocol. For instance, the transboundary harmonization of legislation can be quite a challenge, as illustrated by the analysis conducted by Selier et al. (2016) regarding the management of a trilateral elephant population in the SADC region.

Treaties establishing Transfrontier Conservation Areas

Some particularly significant treaties from a lion conservation viewpoint have a modest geographic scope. These are the bilateral or trilateral treaties establishing TFCAs, although one exceptional treaty involves five parties. Four treaty-based TFCAs of importance to lions are:

- Kgalagadi (Botswana, South Africa)
- Great Limpopo (Mozambique, South Africa, Zimbabwe)
- Kavango Zambezi (Angola, Botswana, Namibia, Zambia, Zimbabwe)
- Malawi-Zambia (Malawi, Zambia)

Another four TFCAs of actual or potential importance to lion conservation are as yet based only on MoUs:

Lubombo (Mozambique, South Africa, Swaziland)
 Iona Skeleton Coast (Angola, Namibia)
 Greater Mapungubwe (Botswana, South Africa, Zimbabwe)
 Chimanimani (Mozambique, Zimbabwe)

TFCAs which are still to be formalized include:

Liuwa Plains-Mussuma (Angola, Zambia),
 Lower Zambezi-Mana Pools (Zambia, Zimbabwe)
 ZiMoZa (Mozambique, Zambia, Zimbabwe)
 Kagera (Rwanda, Tanzania, Uganda)
 Niassa-Selous (Mozambique, Tanzania)
 Mnazi Bay-Quirimbas (Mozambique, Tanzania)

(For the latest developments regarding each TFCAs, see <http://www.peaceparks.org>.)

For illustrative purposes, we discuss one TFCA treaty, selecting the most spectacular one. In 2011, the presidents of Angola, Botswana, Namibia, Zambia and Zimbabwe concluded the Treaty on the Establishment of the Kavango Zambezi Transfrontier Conservation Area (KAZA TFCA), which entered into force a year later. The resulting TFCA encompasses and unites a huge array of pre-existing protected areas and multiple resource use areas in the five countries, many of which are important lion areas, and currently covers approximately 520,000 km² – roughly the size of France. While duly recognizing its ties with the SADC (Article 9), the Treaty formally established the KAZA TFCA as an autonomous ‘international organisation’ with legal personality (Article 3), and headquarters in Kasane (Article 2). The Treaty set up various institutions charged with administering and further developing the KAZA TFCA, including a Ministerial Committee, Committee of Senior Officials, Joint Management Committee, Secretariat and National Committees (Articles 10-23; see also <http://www.kavangozambezi.org>).

The KAZA TFCA aims to ‘maintain and manage’ the shared natural resources and biodiversity of the area to ‘support healthy and viable populations of wildlife species’, and to develop a ‘complementary network of Protected Areas within the KAZA TFCA linked through corridors to safeguard the welfare and continued existence of migratory wildlife species’ (Article 6(1)). Other objectives of relevance to lions are to transform the TFCA into a ‘premier tourist destination in Africa’; to enhance the sustainable use of natural resources to improve human livelihoods and reduce poverty; to ‘promote and facilitate the harmonisation of relevant legislation, policies and approaches’; and to ‘ensure compliance with international protocols and conventions related to the protection and Sustainable Use of species and ecosystems’ (Article 6(1)).

The general principles that the five states are expected to uphold in their pursuit of these objectives include the recognition that the right to utilize natural resources

‘carries with it the obligation to do so in a responsible manner so as to ensure effective Conservation and management for posterity;’ to ensure that wildlife use is sustainable; to rehabilitate declining populations; and generally to take ‘knowledge based decisions derived from interdisciplinary research and traditional knowledge and to exercise precaution when there is insufficient information’ (Article 5). The five partner states are under obligations to ‘ensure the protection and management of those parts of the Kavango Zambezi ecosystem falling directly under their jurisdiction;’ to cooperate in developing common approaches to *inter alia* wildlife management and tourism; and to ensure proper stakeholder engagement at national and local levels (Article 8).

In sum, investing in the implementation of existing TFCA treaties and the adoption of treaties for further areas can evidently be beneficial for lion conservation and sustainable use. Consolidating the Niassa-Selous TFCA would seem particularly important, as this area hosts the largest lion population, estimated at over 5,000 lions (Dickman et al. submitted).

Discussion and recommendations

The above review reveals a significant body of international wildlife law of relevance to the conservation and sustainable use of lions. Moreover, it reveals a significant potential for enhancing the contribution of wildlife treaties in this regard. The time is right to invest in such improvements, and our analysis renders several general and treaty-specific recommendations for doing so. Some of the most significant are provided below.

It is appropriate to place our findings in perspective by noting that no number or combination of relevant treaties can by themselves secure the conservation of lions into the long-term future. International wildlife law provides one set of tools in a much larger toolkit comprising a range of other approaches, mechanisms and disciplines, many of which are likely to be needed.

Implementation and participation

It seems safe to assume that the future of lions would be much more secure if all range states fully lived up to the international obligations identified in the above analysis. However, the implementation of these obligations is affected by pervasive compliance deficiencies due to problems of capacity, governance and enforcement in many range states (Dickman et al. 2015; Dickman et al. submitted). All efforts aimed at decreasing these deficiencies and improving compliance are thus to be encouraged.

Figure 3 shows a summary of Dickman et al.’s (submitted) index of infrastructural fragility for the 33 lion range states. In brief, this index is based on a set of socio-political, habitat and conservation variables that are likely to influence the success of conservation measures to secure lions within each range state. Thus, the geopolitical

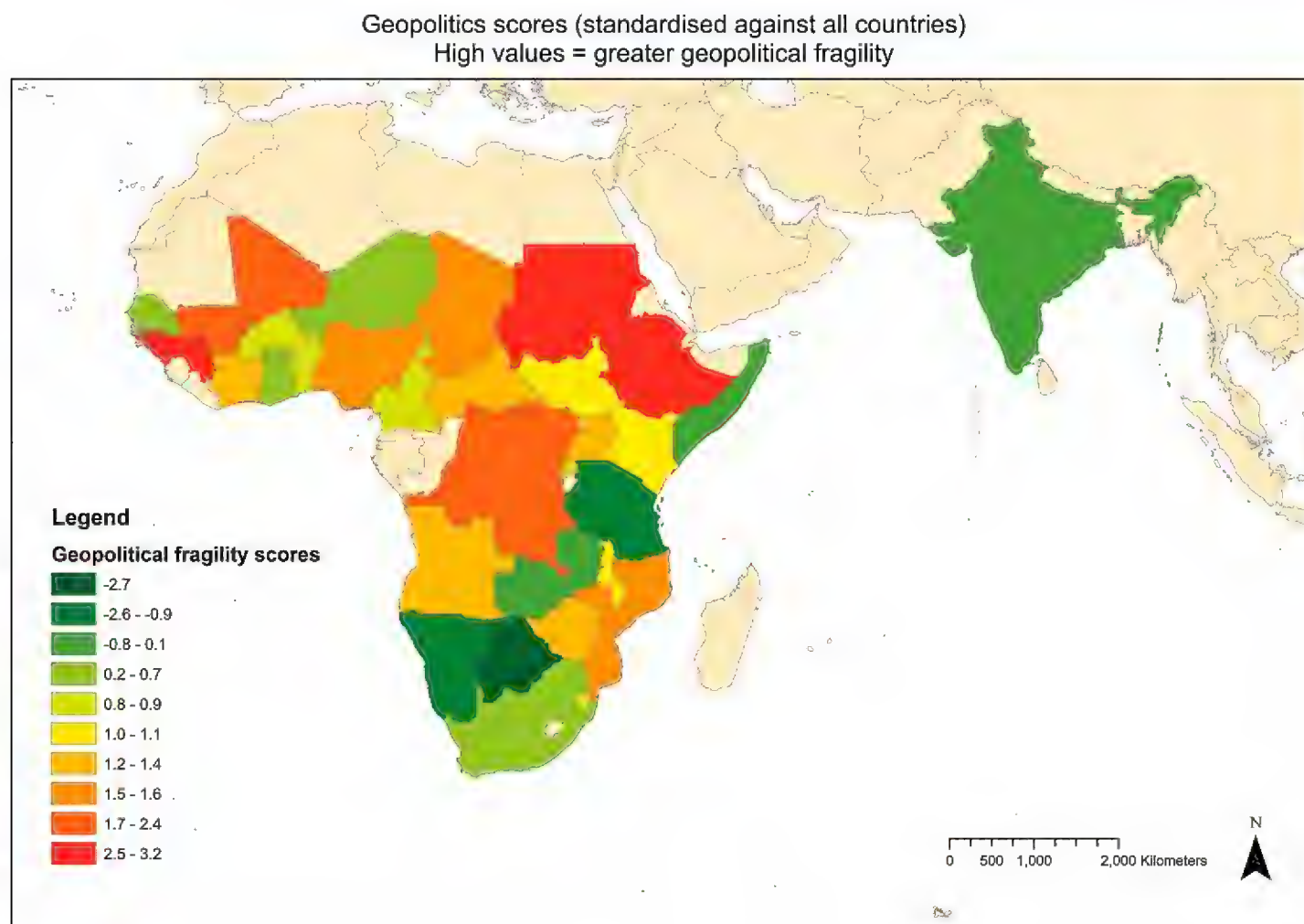


Figure 3. The map shows the geopolitical values of lion range states, where higher values represent greater fragility in the infrastructure of the state (based on Dickman et al., submitted).

score is the sum of standardized (relative to the average of the sample states), national-level data on factors including: the level of political corruption, stability and regulatory quality (governance metrics), measures of economic development (GDP and the Human Development Index), human population growth and density (factors that put pressure on available lion habitat) and the percentage of land designated as protected area (conservation).

Depending on the particular circumstances and the treaty obligation(s) involved, there is a time and a place for top-down as well as bottom-up approaches, for coercive as well as flexible approaches, and for all manner of combinations of these (Treves et al. 2017; Chapron et al. 2017; Redpath et al. 2017). It is important to note in this regard that the participation of local and indigenous communities, poverty alleviation, awareness raising and education have become key features in the implementation of all the major conservation treaties, as expressed in COP decisions, strategies, funding allocations, and guidance documents (see, e.g., Ramsar Convention Secretariat 2010; CBD Secretariat 2011; UNESCO et al. 2012).

Another generic issue is that of participation gaps at the intergovernmental level. The utility of some treaties to lions could be improved through the accession of range states that are still missing as contracting parties, such as Botswana, Namibia and Zambia in the case of the CMS. Further participation gaps are indicated in Table 2.

Site-based treaties

For sites of importance to lions that are listed under the Ramsar and/or World Heritage Convention, it is clearly worthwhile to take advantage of that international status in order to improve site management and avert harmful human impacts, as appropriate. The opportunities to do so are wide-ranging, varying from the Conventions' funding schemes to litigation, and will generally be greatest for sites where lions were part of the official motivation for listing. The possibility of listing on the Montreux Record and/or List of World Heritage in Danger can also provide useful leverage. For listed sites from which lions have disappeared we recommend not losing sight of lions in site management but rather enabling and working towards their future return, in particular by conserving their habitat and prey base.

Likewise, there is clear merit in working towards the listing of additional sites of importance to lions under either Convention. For the World Heritage Convention, range states' tentative lists would be the natural starting point in this connection (see Table 5 for candidates), although some important candidate sites are not yet on these lists – Tanzania's Ruaha National Park being a case in point. Significantly, the listing of transboundary sites is eligible under both the Ramsar and the World Heritage Conventions. The proper conservation and management of transboundary sites for lions can evidently also benefit substantially from their designation as a TFCA through a dedicated treaty. Such a TFCA agreement can also assist in implementing applicable international obligations under other instruments for the sites in question. The consolidation of the Niassa-Selous TFCA is of particular importance from a lion conservation perspective.

Generally, the more international designations a site has, the better its chances of survival and appropriate management. Ramsar designation is easier to achieve than World Heritage listing, although once achieved the latter status is of a higher legal caliber (and is available for a broader range of habitats). Ramsar designation can also be an intermediate step towards ultimate World Heritage listing.

Both for existing and potential future sites with an international designation, it is essential to address the unsustainable killing of lions and their prey not only within but also around the borders of those sites, and to avoid simply relocating human-lion conflict to the sites' peripheries.

Species-based treaties

CITES provides a necessary framework for trade-related threats to lions and there remains scope to strengthen the Convention's restrictions, as necessary, either by uplisting African lion populations to Appendix I or adding further annotations to the current Appendix II listing. If established, the joint CITES-CMS African Carnivores Initiative will provide an opportunity to address problems affecting implementation. However, CITES does not provide sufficient mechanisms for addressing threats other than trade.

Regarding the CMS, our review indicates that there is definite scope and need for reinforcement and coordination of actions to further lion conservation and sustainable

use across the species' range. All the other treaties we reviewed appear to be of actual or potential use in this regard, and sometimes contribute crucial pieces of the puzzle. Yet, all of them are subject to limitations. The Ramsar Convention is limited to wetlands; the WHC is limited to sites of outstanding universal value; CITES is limited to international trade; the CBD is very general and lacks a species-specific focus; the African Convention is institutionally dormant and several important range states are not parties; the Bern Convention is of marginal significance; the SADC Protocol has a limited geographic scope and lacks a species-specific focus; and the various TFCA treaties have geographically limited and fragmented scopes, and remain conceptual in some of the most significant habitats for lions. Given the fragmented collection of treaties which currently apply to lions and the absence of adequate international instruments and/or institutions for lion conservation in at least portions of the species' range, an important role appears, in principle, to be reserved for the CMS, both in terms of coordination and gap-filling. Listing lions under the Convention would be a logical step in this regard, and our analysis provides strong support for doing so.

The species' currently proposed listing on Appendix II would both signal the need to develop more elaborate species-specific frameworks for lion conservation and sustainable use and increase the avenues available for achieving this. Should CMS COP12 decide to list the lion or any of its populations on the CMS Appendices, it would further seem sensible for the COP to designate lions for Concerted Action – whether this be as a precursor to the eventual development of an ancillary instrument or as an alternative thereto. Concerted Action for the Asiatic lion could, in principle, be implemented by including this subspecies in CAMI. For Africa, the proposed CMS-CITES African Carnivores Initiative has the potential to enhance coordination and collaboration amongst existing conservation initiatives and instruments throughout the African lion's range and could play an especially pronounced role in subregions which lack alternative treaty mechanisms to support transboundary cooperation and national implementation. Indeed, the establishment of coordination and support mechanisms under the CMS should, in principle, assist range states to implement legal commitments which they have long held under other international instruments (such as the African Convention), regardless of whether or not they at some stage decide to undertake *new* legal commitments through CMS Appendix I listing or the development of an ancillary treaty.

Concluding observations

With their long-term, legally binding commitments on a transboundary scale; their high profiles; their platforms for cooperation and coordination; and various support mechanisms, international treaties have a distinct contribution to make to lion conservation. The above review makes clear what can and cannot be expected of international wildlife law in this regard. Importantly, our review shows that there is still much to be gained, partly by advancing the effective implementation of the currently applicable law in the diverse and often challenging domestic contexts of the various lion range states, and partly by enhancing the legal framework itself.

At the intergovernmental level, listing lions under the CMS can be expected to render particular advantages in terms of the coordination and facilitation of lion conservation action across the species' range. Other recommendations flowing from our analysis include making optimal use of the World Heritage and Ramsar Conventions, CITES and TFCA treaties for lion conservation. Overall, in order to maximize range states' compliance with their international commitments concerning lions, the development and implementation of participatory conservation strategies adjusted to national and local circumstances appears crucial.

Acknowledgements

AT acknowledges the support of the Netherlands Organization for Scientific Research, as part of the project *Ius Carnivoris* (project no.: 452-13-014). AJD undertook this work while a Kaplan Senior Research Fellow and EAM was Rivington Winant Research Fellow in Conservation. The authors thank Clara Nobbe for providing information on the CMS Secretariat's recent lion-related activities, and thank the reviewers for their helpful comments.

References

- Abade L, Macdonald DW, Dickman AJ (2014) Assessing the relative importance of landscape and husbandry factors in determining large carnivore depredation risk in Tanzania's Ruaha landscape. *Biological Conservation* 180: 241–248. <https://doi.org/10.1016/j.biocon.2014.10.005>
- Arthur E (2014) Poaching cultural property: invoking cultural property law to protect elephants. *Journal of International Wildlife Law and Policy* 17: 231–253. <https://doi.org/10.1080/13880292.2014.957029>
- Bauer H, Nowell K, Breitenmoser U, Jones M, Sillero-Zubiri C (2015) Review of Lion Conservation Strategies. UNEP/CMS.
- Bauer H, Packer C, Funston PF, Henschel P, Nowell K (2016) *Panthera leo*. The IUCN Red List of Threatened Species 2016: e.T15951A107265605. <https://doi.org/10.4337/9781781004791.00008>
- Bertzky B (2014) World Heritage and species: safe havens for wildlife? *World Heritage* 73: 30–39.
- Bowman M (2016) Law, legal scholarship and the conservation of biological diversity: 2020 vision and beyond. In: Bowman M, Davies P, Goodwin E (Eds) *Research handbook on biodiversity and law*. Edward Elgar, Cheltenham, 3–54.
- Bowman M, Redgwell C, Davies P (2010) *Lyster's International Wildlife Law*. 2nd ed. Cambridge University Press, Cambridge. <https://doi.org/10.1017/CBO9780511975301>
- Breitenmoser U, Mallon DP, Ahmad Khan J, Driscoll C (2008) *Panthera leo ssp. persica*. The IUCN Red List of Threatened Species 2008: 3.T15952A5327221.
- Caro TM (2003) Umbrella species: critique and lessons from East Africa. *Animal Conservation* 6: 171–181. <https://doi.org/10.1017/S1367943003003214>

- CBD Secretariat (2011) Livelihood alternatives for the unsustainable use of bushmeat. CBD Secretariat, Montreal.
- Ceballos G, Ehrlich PR, Barnosky AD, García A, Pringle RM, Palmer TM (2015) Accelerated modern human-induced species losses: entering the sixth mass extinction. *Science Advances* 1: e1400253. <https://doi.org/10.1126/sciadv.1400253>
- Chapron G, Kaczensky P, Linnell JDC, von Arx M, Huber D, Andrén H, López-Bao JV, Adamec M, Álvares F, Anders O, Balčiauskas L, Balys V, Bedő P, Bego F, Blanco JC, Breitenmoser U, Brøseth H, Bufka L, Bunikyte R, Ciucci P, Dutsov A, Engleder T, Fuxjäger C, Groff C, Holmala K, Hoxha B, Iliopoulos Y, Ionescu O, Jeremić J, Jerina K, Kluth G, Knauer F, Kojola I, Kos I, Krofel M, Kubala J, Kunovac S, Kusak J, Kutal M, Liberg O, Majić A, Männil P, Manz R, Marboutin E, Marucco F, Melovski D, Mersini K, Mertzanis Y, Mysłajek RW, Nowak S, Odden J, Ozolins J, Palomero G, Paunović M, Persson J, Potočnik H, Quenette P-Y, Rauer G, Reinhardt I, Rigg R, Ryser A, Salvatori V, Skrbinišek T, Stojanov A, Swenson JE, Szemethy L, Trajçe A, Tsingarska-Sedefcheva E, Váňa M, Veeroja R, Wabakken P, Wölfl M, Wölfl S, Zimmermann F, Zlatanova D, Boitani L (2014) Recovery of large carnivores in Europe's modern human-dominated landscapes. *Science* 346: 1517–1519. <https://doi.org/10.1126/science.1257553>
- Chapron G, Epstein Y, Trouwborst A, López-Bao JV (2017) Bolster legal boundaries to stay within planetary boundaries. *Nature Ecology & Evolution* 1: 0086. <https://doi.org/10.1038/s41559-017-0086>
- Cliquet A, Backes C, Harris J, Howsam P (2009) Adaptation to climate change: legal challenges for protected areas. *Utrecht Law Review* 5: 158–175. <https://doi.org/10.18352/ulr.100>
- Department of Environmental Affairs (2017) Lion export quota for 2017 communicated to the CITES Secretariat in line with CITES requirements. <http://www.gov.za/speeches/lion-export-quota-2017-communicated-cites-secretariat-line-cites-requirements-28-jun-2017> [accessed: 28 June 2017]
- Dickman AJ, Hinks AE, Macdonald EA, Burnham D, Macdonald DW (2015) Priorities for global felid conservation. *Conservation Biology* 29: 854–864. <https://doi.org/10.1111/cobi.12494>
- Dickman A, Hinks A, Riggio J, Jacobson A, Loveridge A, Macdonald E, Burnham D, Bauer H, Funston P, Henschel P, Hunter L, Jacobsen K, Lindsey P, Packer C, Silero C, Macdonald DW (submitted) Ecological and socio-political fragility of free-ranging African lion populations. Submitted to *Conservation Biology*.
- Di Marco M, Boitani L, Mallon D, Hoffmann M, Iacucci A, Meijaard E, Visconti P, Schipper J, Rondinini C (2014) A retrospective evaluation of the global decline of carnivores and ungulates. *Conservation Biology* 28: 1109–1118. <https://doi.org/10.1111/cobi.12249>
- Di Minin E, Slotow R, Hunter LTB, Montesino Pouzols F, Toivonen T, Verburg PH, Leader-Williams N, Petracca L, Moilanen A (2016) Global priorities for national carnivore conservation under land use change. *Scientific Reports* 6: 23814. <https://doi.org/10.1038/srep23814>
- Epstein Y, López-Bao JV, Chapron G (2016) A legal-ecological understanding of favorable conservation status for species in Europe. *Conservation Letters* 9: 81–88.
- European Commission (2016) Larger than elephants: inputs for an EU strategic approach to wildlife conservation in Africa – regional analysis. Directorate-General for International Cooperation and Development, Brussels. <https://doi.org/10.1111/conl.12200>

- Gardner RC, Connolly KD, Bamba A (2009) African Wetlands of International Importance: assessment of benefits associated with designations under the Ramsar Convention. *Georgetown International Environmental Law Review* 21: 257–294.
- Gillespie A (2011) Conservation, biodiversity and international law. Edward Elgar, Cheltenham. <https://doi.org/10.4337/9780857935168>
- Hance J (2016) Cecil's legacy: could the death of one lion start a conservation movement? *The Guardian*. [accessed: 27 April 2016]
- Henschel P, Coad L, Burton C, Chataigner B, Dunn A, Macdonald D, Saidu Y, Hunter L (2014) The lion in West Africa is critically endangered. *Plos ONE* 9: e83500. <https://doi.org/10.1371/journal.pone.0083500>
- Henschel P, Bauer H, Sogbohossou E, Nowell K (2015) *Panthera leo* (West Africa subpopulation). The IUCN Red List of Threatened Species 2015: e.T68933833A54067639.
- HSBC (2014) World Heritage Sites and Ramsar Wetlands Policy. HSBC.
- IISD (2016) Summary of the Seventeenth Meeting of the Conference of the Parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora: 24 September – 4 October 2016. *Earth Negotiations Bulletin* 21: 97.
- IUCN (2006a) Conservation Strategy for the Lion in West and Central Africa. IUCN SSC Cat Specialist Group, Yaounde.
- IUCN (2006b) Conservation Strategy for the Lion in East and Southern Africa. IUCN SSC Cat Specialist Group, Johannesburg.
- Lee R, Filgueira B, Caddell R, Frater L (2010) Review of the current organization and activities of CMS and the CMS family: first step of the inter-sessional future shape process. UNEP/CMS/Inf.10.14.8.
- Lewis MG (2009) CITES and rural livelihoods: the role of CITES in making wildlife conservation and poverty reduction mutually supportive. *Journal of International Wildlife Law and Policy* 12: 248–275. <https://doi.org/10.1080/13880290903433014>
- Lindsey PA, Petracca LS, Funston PJ, Bauer H, Dickman A, Everatt K, Flyman M, Henschel P, Hinks AE, Kasiki S, Loveridge A, Macdonald DW, Mandisodza R, Mgoola W, Miller SM, Nazerali S, Siegel L, Uiseb K, Hunter LTB (2017) The performance of African protected areas for lions and their prey. *Biological Conservation* 209: 137–149. <https://doi.org/10.1016/j.biocon.2017.01.011>
- Loveridge AJ, Wang SW, Frank LG, Seidensticker J (2010) People and wild felids: conservation of cats and management of conflicts. In: Macdonald DW, Loveridge AJ (Eds) *Biology and conservation of wild felids*. Oxford University Press, Oxford, 161–196.
- Loveridge AJ, Valeix M, Chapron G, Davidson Z, Mtare G, Macdonald DW (2016) Conservation of large predator populations: demographic and spatial responses of African lions to the intensity of trophy hunting. *Biological Conservation* 204: 247–254. <https://doi.org/10.1016/j.biocon.2016.10.024>
- Macdonald DW (2016) Report on lion conservation with particular respect to the issue of trophy hunting. Commissioned by UK Under Secretary of State for the Environment. WildCRU, University of Oxford, Oxford.
- Macdonald DW, Burnham D, Hinks AE, Wrangham R (2012) A problem shared is a problem reduced: seeking efficiency in the conservation of felids and primates. *Folia Primatologica* 83: 171–215. <https://doi.org/10.1159/000342399>

- Macdonald DW, Boitani L, Dinerstein E, Fritz H, Wrangham R (2013) Conserving large mammals. In: Macdonald DW, Willis KJ (Eds) *Key topics in conservation biology* 2. Wiley-Blackwell, Oxford, 277–311. <https://doi.org/10.1002/9781118520178.ch16>
- Macdonald EA, Burnham D, Hinks A, Dickman AJ, Yadvinder M, Macdonald DW (2015) Conservation inequality and the charismatic cat: *Felis felis*. *Global Ecology and Conservation* 3: 851–866. <https://doi.org/10.1016/j.gecco.2015.04.006>
- Macdonald DW, Jacobsen KS, Burnham D, Johnson PJ, Loveridge AJ (2016) Cecil: a moment or a movement? Analysis of media coverage of the death of a lion, *Panthera leo*. *Animals* 6: 26. <https://doi.org/10.3390/ani6050026>
- Macdonald DW, Chapron G (2017) Outbreeding ideas for conservation success. *Oryx* 51: 206. <https://doi.org/10.1017/S0030605317000151>
- Macdonald DW, Loveridge AJ, Dickman A, Johnson PJ, Jacobsen KS, Du Preez B (2017) Lions, trophy hunting and beyond: knowledge gaps and why they matter. *Mammal Review*: published online. [accessed: 31 July 2017]
- Nasi R, Brown D, Wilkie D, Bennett E, Tutin C, Van Tol G, Christophersen T (2008) *Conservation and use of wildlife-based resources: the bushmeat crisis*. Secretariat of the CBD, Montreal.
- Panthera, WildAid, WildCRU (2017) *Beyond Cecil: Africa's lions in crisis*. Panthera, WildAid.
- Ramsar Convention Secretariat (2010) *Participatory skills: establishing and strengthening local communities' and indigenous people's participation in the management of wetlands*. Ramsar Convention Secretariat, Gland.
- Ramsar Convention Secretariat (2013) *The Ramsar Convention Manual*. 6th ed. Ramsar Convention Secretariat, Gland.
- Redpath S, Linnell JDC, Festa-Bianchet M, Boitani L, Bunnefeld N, Dickman A, Gutiérrez RJ, Irvine RJ, Johansson M, Majić A, McMahon BJ, Pooley S, Sandström C, Sjölander-Lindqvist A, Skogen K, Swenson JE, Trouwborst A, Young J, Milner-Gulland EJ (2017) Don't forget to look down – collaborative approaches to predator conservation. *Biological Reviews*: published online. [accessed: 24 March 2017]
- Riggio J, Jacobson A, Dollar L, Bauer H, Becker M, Dickman A, Funston P, Groom R, Henschel P, De Iongh H, Lichtenfeld L, Pimm S (2013) The size of savannah Africa: a lion's (*Panthera leo*) view. *Biodiversity and Conservation* 22: 17–35. <https://doi.org/10.1007/s10531-012-0381-4>
- Ripple WJ, Estes JA, Beschta RL, Wilmers CC, Ritchie EG, Hebblewhite M, Berger J, Elmhagen B, Letnic M, Nelson MP, Schmitz OJ, Smith DW, Wallach AD, Wirsing AJ (2014) Status and ecological effects of the world's largest carnivores. *Science* 343: 1241484. <https://doi.org/10.1126/science.1241484>
- Ripple WJ, Newsome TM, Wolf C, Dirzo R, Everatt KT, Galetti M, Hayward MW, Kerley GIH, Levi T, Lindsey PA, Macdonald DW, Malhi Y, Painter LE, Sandom CJ, Terborgh J, Van Valkenburgh B (2015) Collapse of the world's largest herbivores. *Science Advances* 1: e1400103. <https://doi.org/10.1126/sciadv.1400103>
- Ripple WJ, Chapron G, Lopez-Bao JV, Durant SM, Macdonald DW, Lindsey PA, Bennett EL, Beschta RL, Bruskotter JT, Campos-Arceiz A, Corlett RT, Darimont CT, Dickman AJ, Dirzo R, Dublin HT, Estes JA, Everatt KT, Galetti M, Goswami VR, Hayward MW, Hedges S, Hoffmann M, Hunter LTB, Kerley GI, Letnic M, Levi T, Maisels F, Morrison

- JC, Nelson MP, Newsome TM, Painter L, Pringle RM, Sandom CJ, Terborgh J, Treves A, Van Valkenburgh B, Vucetich JA, Wirsing AJ, Wallach AD, Wolf C, Woodroffe R, Young H, Zhang L (2016a) Saving the world's terrestrial megafauna. *BioScience* 66: 807–812. <https://doi.org/10.1093/biosci/biw092>
- Ripple WJ, Abernethy K, Betts MG, Chapron G, Dirzo R, Galetti M, Levi T, Lindsey PA, Macdonald DW, Machovina B, Newsome TM, Peres CA, Wallach AD, Wolf C, Young H (2016b) Bushmeat hunting and extinction risk to the world's mammals. *Royal Society Open Science* 3: 160498. <https://doi.org/10.1098/rsos.160498>
- Sandom CJ, Williams J, Burnham D, Dickman AJ, Hinks E, Macdonald EA, Macdonald DW (2017) Deconstructed cat communities: quantifying the threat to felids from prey defaunation. *Diversity and Distributions* 23: 667–679. <https://doi.org/10.1111/ddi.12558>
- Scott KN (2016) Non-compliance procedures and the implementation of commitments under wildlife treaties. In: Bowman M, Davies P, Goodwin E (Eds) *Research handbook on biodiversity and law*. Edward Elgar, Cheltenham, 414–436. <https://doi.org/10.4337/9781781004791.00025>
- Selier SAJ, Slotow R, Blackmore A, Trouwborst A (2016) The legal challenges of transboundary wildlife management at the population level: the case of a trilateral elephant population in Southern Africa. *Journal of International Wildlife Law and Policy* 19: 101–135. <https://doi.org/10.1080/13880292.2016.1167460>
- TAWIRI (2007) *Proceedings of the First Tanzania Lion and Leopard Conservation Action Plan Workshop*. Tanzania Wildlife Research Institute, Arusha.
- Treves A, Chapron G, López-Bao JV, Shoemaker C, Goeckner AR, Bruskotter JT (2017) Predators and the public trust. *Biological Reviews* 92: 248–270. <https://doi.org/10.1111/brv.12227>
- Trouwborst A (2012) Transboundary wildlife conservation in a changing climate: adaptation of the Bonn Convention on Migratory Species and its daughter instruments to climate change. *Diversity* 4: 258–300. <https://doi.org/10.3390/d4030258>
- Trouwborst A (2015a) Global large carnivore conservation and international law. *Biodiversity and Conservation* 24: 1567–1588. <https://doi.org/10.1007/s10531-015-0894-8>
- Trouwborst A (2015b) Law and conservation conflicts. In: Redpath SM, Gutiérrez RJ, Wood KA, Young JC (Eds) *Conflicts in conservation: navigating towards solutions*. Cambridge University Press, Cambridge, 108–118. <https://doi.org/10.1017/CBO9781139084574.009>
- Trouwborst A (2017) Large carnivore conservation under the Bern Convention, with special reference to the Balkan lynx. *Cat News*: in press.
- Trouwborst A, Krofel M, Linnell JDC (2015) Legal implications of range expansions in a terrestrial carnivore: the case of the golden jackal (*Canis aureus*) in Europe. *Biodiversity and Conservation* 24: 2593–2610. <https://doi.org/10.1007/s10531-015-0948-y>
- Trouwborst A, Boitani L, Linnell JDC (2017a) Interpreting 'favourable conservation status' for large carnivores in Europe: how many are needed and how many are wanted? *Biodiversity and Conservation* 26: 37–61. <https://doi.org/10.1007/s10531-016-1238-z>
- Trouwborst A, Fleurke FM, Linnell JDC (2017b) Norway's wolf policy and the Bern Convention on European Wildlife: avoiding the 'manifestly absurd'. *Journal of International Wildlife Law and Policy* 20: in press.

- Trouwborst A, Blackmore A, Boitani L, Bowman M, Caddell R, Chapron G, Cluquet A, Couzens E, Epstein Y, Fernández-Galiano E, Fleurke F, Gardner R, Hunter L, Jacobsen K, Krofel M, Lewis M, López-Bao JV, Macdonald D, Redpath S, Wandesforde-Smith G, Linnell JDC (2017c) International wildlife law: understanding and enhancing its role in conservation. *BioScience* 67: published online. [8 August 2017] <https://doi.org/10.1093/biosci/bix086>
- UNESCO, ICCROM, ICOMOS, IUCN (2012) World Heritage Resource Manual: Managing Natural World Heritage. UNESCO, Paris.
- US Fish and Wildlife Service (2015) Endangered and Threatened Wildlife and Plants; Listing Two Lion Subspecies. Federal Register 80, 80000–80056.
- Valeix M, Loveridge AJ, Davidson Z, Madzikanda H, Fritz H, Macdonald DW (2010) How key habitat features influence large terrestrial carnivore movements: waterholes and African lions in a semi-arid savanna of north-western Zimbabwe. *Landscape Ecology* 25: 337–351. <https://doi.org/10.1007/s10980-009-9425-x>
- Venkataraman M, Macdonald DW, Montgomery R (2014) Managing success: Asiatic lion conservation, interface problems and people's perceptions in the Gir Protected Area. *Biological Conservation* 174: 120–126. <https://doi.org/10.1016/j.biocon.2014.03.025>
- Wandesforde-Smith G (2016) Looking for law in all the wrong places? Dying elephants, evolving treaties and empty threats. *Journal of International Wildlife Law and Policy* 19: 365–381. <https://doi.org/10.1080/13880292.2016.1248701>
- Watts S (2016) Protection of the African lion: a critical analysis of the current international legal regime. *Potchefstroom Electronic Law Journal* 19: 6. <https://doi.org/10.17159/1727-3781/2016/v19i0a1158>
- Williams V, Newton D, Loveridge A, Macdonald D (2015) Bones of contention: an assessment of the South African trade in African lion *Panthera leo* bones and other body parts. TRAFFIC & WildCRU Joint Report.
- Williams VL, Loveridge AJ, Newton DJ, Macdonald DW (submitted a) The trade in *Panthera leo* bones across Africa and to East-Southeast-Asia. Submitted to Plos ONE.
- Williams VL, Loveridge AJ, Newton DJ, Macdonald DW (submitted b) Pan-African survey of the trade in lion body parts. Submitted to Plos ONE.
- Wold C (2008) World Heritage Species: a new legal approach to conservation. *Georgetown International Environmental Law Review* 20: 337–396.
- World Heritage Committee (2016) Operational Guidelines for the Implementation of the World Heritage Convention, update October 2016, WHC.16/01. UNESCO World Heritage Centre, Paris.
- Wrangham RW, Hagel G, Leighton M, Marshall AJ, Walda P, Nishida T (2008) The Great Ape World Heritage Species Project. In: Stoinski TS, Steklis HD, Mehlman PT (Eds) *Conservation in the 21st century: gorillas as a case study*. Springer, New York, 282–295.
- Zhou Z, Newman C, Buesching CD, Meng X, Macdonald DW, Zhou Y (2016) Revised taxonomic binomials jeopardize protective wildlife legislation. *Conservation Letters* 9: 313–315. <https://doi.org/10.1111/conl.12289>